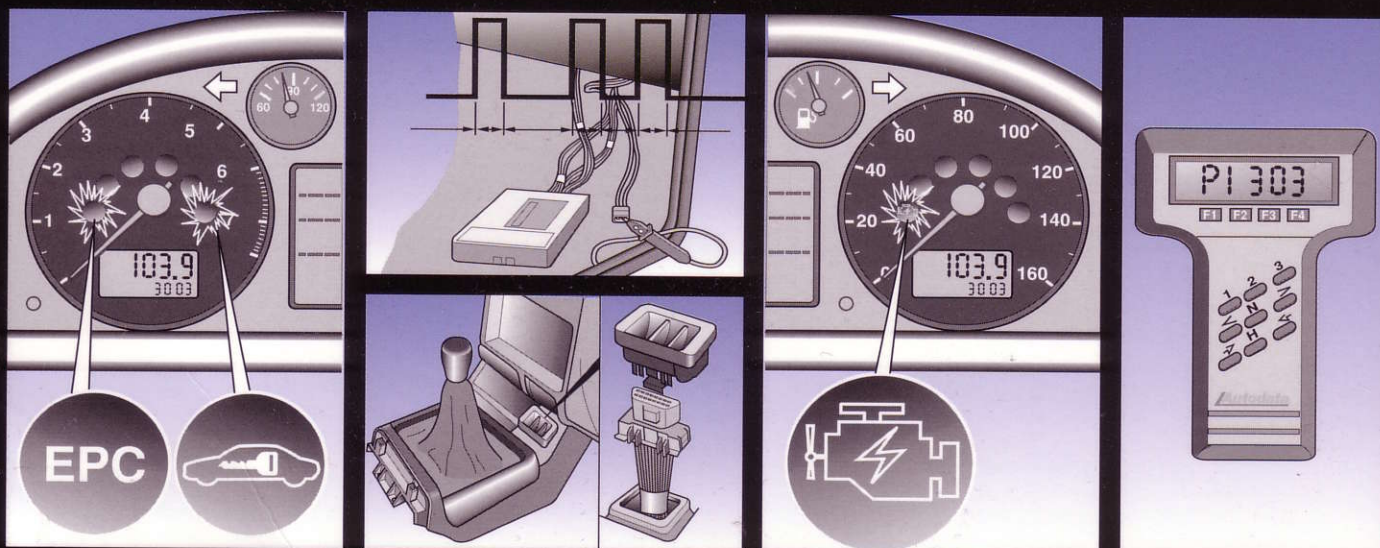


# Diagnostic Trouble Codes

## Fault locations and probable causes

- Flash, MIL and EOBD codes
- Engine management systems
- Transmissions
- Immobilizers
- Data link connector locations

**Petrol and Diesel Cars, MPVs, 4x4s and LCVs 1994-2004**





# Diagnostic Trouble Codes

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Fault locations and probable causes

**2004**

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Flash, MIL and EOBD codes

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Engine management systems

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Immobilizers

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Data link connector locations

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**Petrol and Diesel Cars, MPVs,  
4x4s and LCVs 1994-2004**

## **Caution:**

The information used to compile this manual has been sourced from the vehicle manufacturers information and is believed to be the latest available in May 2004. Manufacturers' information is liable to change at any time and there may have been updates or revisions which applied to the content of this manual but were not available at the time of compilation. Later revisions published by the manufacturers may contain revisions which would be applied retrospectively to the information contained in this manual.

The information contained in this manual applies only to standard models and does not apply to vehicles fitted with equipment other than the standard production options.



# Contents

This manual is a comprehensive single source of information on diagnostic trouble codes for engine management, transmission and immobilizer systems for cars and light commercials introduced or revised during the period 1994-2004.

The manual is part of a series from Autodata and has been written and presented in a way to enable any professional automotive technician, with appropriate skills and competence, to make accurate tests and diagnoses, on the engine management, transmission and immobilizer systems.

Detailed knowledge of self-diagnosis systems is not required to make full use of this publication. With a basic understanding of fuel and electrical systems, successful trouble shooting and fault repair should be possible.

Using this manual, in conjunction with the Autodata CD2, or the Pin Data, Engine Management and Wiring Diagrams manuals, time and expense can be saved by quickly tracing and rectifying the cause of obscure and/or intermittent faults.

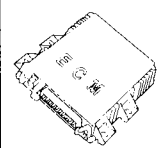
Where possible, procedures for accessing trouble codes without special diagnostic equipment are given, but increasingly some form of 'scan tool' is required to successfully read the fault memories of control modules.

Each chapter covers a range of models sharing the same trouble code table and lists the codes in numerical or alphabetical order with their fault locations and probable causes.

The probable causes column identifies the various different areas of the system that should be investigated in addition to the primary component in the fault location column.

If a trouble code has been logged, the fault location can be looked up in the trouble code table. This will give suggested probable causes, which should be the primary areas for checking. Most of these probable causes will suggest checking the wiring as well as the primary component in the circuit. The multi-plugs, wiring continuity, insulation and resistance should all be verified before replacing components.

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156 1,6/1,8/2,0 (MT)	1997-00	Bosch Motronic M 1.5.5/M 2.10.3/4	91
166 2,0	1998-00	Bosch Motronic M 1.5.5/M 2.10.3/4	91
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80 1,6/2,0	1991-07/92	Bosch Mono-Motronic MA1.2.1	130
80 1,6/2,0	08/92-95	Bosch Mono-Motronic MA1.2.3	133
80 1,9 TDI	1991-06/93	Bosch EDC 1.2.3/4/6/9	135
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80 2,0 16V	1991-96	Bosch KE Motronic 1.2/1.2.1/1.2.2	139
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A8	1994-02	All systems	94
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S8	1999-03	All systems	94
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<b>S420 (140)</b>	1995-98	Bosch ME 1.0	<b>433</b>
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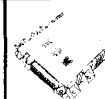


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Laguna 2,0	1994-96	Siemens MPI/Fenix 3B	508
Laguna 2,0	1996-01	Siemens Fenix 5	508
Laguna 2,0 16V	1996-99	Siemens Fenix 5	508



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Laguna 2,0 16V	1999-01	Siemens Sirius 32	526
Laguna 3,0 V6	1994-98	Siemens MPI	508
Laguna 3,0 V6 24V	1997-01	Bosch Motronic MP7.0	508
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Master 2,8D Turbo	1998-02	Sagem	528
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Mégane 1,9D Turbo	1999-02	Bosch common rail	523
Mégane 1,9D Turbo	1999-02	Bosch MSA 15.5/AS3	521
Mégane 2,0 16V	1996-99	Siemens Fenix 5	508
Mégane 2,0 16V	1999-02	Siemens Sirius 32	508
Mégane 2,0 16V IDE	1999-02	Siemens Sirius 3H	512
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Scénic 1,9D Turbo	1999-02	Bosch common rail	523
Scénic 1,9D Turbo	1999-03	Bosch MSA 15.5/AS3	521
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Scénic RX4 1,9D Turbo	2000-02	Bosch common rail	523
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25 1,8/1,8 VVC	1999-04	MEMS 3	543
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45 2,0	1999-04	Siemens EMS 2000	543
75 1,8/1,8 Turbo	1999-04	MEMS 3	543





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200 1,8 Vi	1995-99	Rover MEMS	540
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400/Tourer 1,6	1989-96	Honda PGM-FI	546
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400/Tourer 2,0/Turbo	1992-99	Rover MEMS	540
600 1,8/2,0/2,3	1993-99	Honda PGM-FI	551
620/820 Turbo	1992-99	Rover MEMS	540
820	1991-99	Rover MEMS	540
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Metro 1,1/1,4	1990-95	Rover MEMS	540
MG TF 1,6/1,8	2002-04	MEMS 3	543
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900 2,0/2,3 <i>Trouble codes: EOBD type</i>	1993-98	Bosch Motronic 2.10.2	558
900 2,5 <i>Trouble codes: Flash type</i>	1993-98	Bosch Motronic 2.8.1	556
900 2,5 <i>Trouble codes: EOBD type</i>	1993-98	Bosch Motronic 2.8.1	558
9000 2,0/Turbo	1994-98	Trionic	560
9000 2,3 Aero	1994-98	Trionic	560
9000 2,3/Turbo	1994-98	Trionic	560
9000 3,0 V6 <i>Trouble codes: EOBD type</i>	1995-97	Bosch Motronic 2.8.1	571
9-3 2,0 Turbo	1998-03	Trionic T5/T7	562
9-3 2,0/2,3 <i>Trouble codes: Flash type</i>	1998-00	Bosch Motronic 2.10.3	556
9-3 2,0/2,3 <i>Trouble codes: EOBD type</i>	1998-00	Bosch Motronic 2.10.3	558
9-3 2,2 D Turbo	1998-02	Bosch EDC 15/PSG 16	567



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Arosa	1997-04	All systems	576
Ibiza/Cordoba	1999-02	All systems	576
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Ibiza/Cordoba 1,05	1993-97	Bosch Mono-Motronic MA1.2.2	578
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Ibiza/Cordoba 1,4/1,6	1996-99	Magneti Marelli 1AV	576
Ibiza/Cordoba 1,4/1,6	1993-99	Bosch Mono-Motronic MA1.2.3	583
Ibiza/Cordoba 1,6	1996-99	Siemens Simos	576
Ibiza/Cordoba 1,7/1,9 SDI	1996-99	Bosch EDC 1.3.3/15V	576
Ibiza/Cordoba 1,8	1993-94	Bosch Mono-Motronic MA1.2.2	578
Ibiza/Cordoba 1,8	1993-94	Bosch Mono-Motronic MA1.2.3	581
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Inca 1,9 D	1996-04	Bosch EDC	576
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Carina E 1,6/1,8/2,0	1992-98	TCCS	609
Carina E 2,0D	1992-96	TCCS	609
Carina E 2,0D Turbo	1996-98	TCCS	609
Carina II 1,6	1988-90	TCCS	606
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Celica 2,0	1986-99	TCCS	619
Corolla 1,3	1990-01/00	TCCS	600
Corolla 1,6	1988-01/00	TCCS	600
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Astra 2,0/16V	1986-91	Bosch Motronic	682
Astra-F 1,4/1,6/1,8 <i>Trouble codes: Flash type</i>	1991-98	Multec	669
Astra-F 1,4/1,6/1,8/2,0 <i>Trouble codes: EOBD type</i>	1994-98	Multec/Simtec 56.5/70	675
Astra-F 1,8/2,0 16V <i>Trouble codes: Flash type</i>	1993-98	Simtec 56.0/56.1/56.5	687
Astra-F 2,0/16V	1991-98	Bosch Motronic	682
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Astra-G 1,4/1,6/1,8/2,0	1998-00	Multec/Simtec 56.5/70	675
Astra-G 1,7 TD	1999-04	Denso HDRC	679
Astra-G 1,7 TD	2002-04	Bosch EDC 15C7	693
Astra-G 1,7 TD/2,0 TD/2,2 TD	1998-04	Bosch EDC 15M	690
Astra-G 2,0 Turbo	2000-04	Bosch Motronic ME1.5.5	666
Astra-G 2,2	2000-04	GMPT-E15	697
Calibra 2,0	1996-98	Simtec 56.5	703
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Carlton/Omega-B 2,0/2,5/2,6/3,0 24V	1986-00	Bosch Motronic	682
Cavalier/Vectra 1,6/1,8	1988-95	Multec	669
Cavalier/Vectra 2,0 16V	1993-95	Simtec 56.0/56.1/56.5	687
Cavalier/Vectra 2,0 & 4x4	1988-95	Bosch Motronic	682
Cavalier/Vectra/Calibra 2,0 16V/Turbo & 4x4/2,5	1990-98	Bosch Motronic	682
Combo-C 1,6	2001-04	Multec S(F)/Motronic/Simtec 71/GMPT-E15	672
Combo-C 1,7 TD	2001-04	Denso HDRC	679
Corsa-B/Combo 1,0/1,2	1997-00	Multec S(F)/Motronic/Simtec 71/GMPT-E15	672
Corsa-B/Combo 1,2/1,4/1,6 <i>Trouble codes: Flash type</i>	1993-98	Multec	669
Corsa-B/Combo 1,4/1,6 <i>Trouble codes: EOBD type</i>	1994-00	Multec/Simtec 56.5/70	675
Corsa-C 1,0/1,2/1,4/1,6/1,8	2000-04	Multec S(F)/Motronic/Simtec 71/GMPT-E15	672
Corsa-C 1,7 TD	2000-04	Denso HDRC	679
Frontera-A 2,0/2,2/2,4	1991-98	Bosch Motronic	682
Frontera-A 2,5 TD	1995-98	Bosch EDC	679
Frontera-B 2,2/3,2 <i>Trouble codes: Y22XE/Y32SE (6VD1) engines</i>	1998-03	Multec S(F)/Motronic/Simtec 71/GMPT-E15	672
Frontera-B 2,2 <i>Trouble codes: Y22SE engines</i>	2000-03	Multec S/S(F)	705
Frontera-B 2,2 TD	1998-02	Bosch EDC 15M	690
Frontera-B 2,2 TD	2003-04	Bosch PSG 16	693
Nova/Corsa 1,2/1,4/1,6	1990-93	Multec	669
Omega-B 2,0	1995-00	Multec/Simtec 56.5/70	675
Omega-B 2,0 16V	1994-95	Simtec 56.0/56.1/56.5	687
Omega-B 2,0 TD/2,2 TD	1998-03	Bosch EDC 15M	690
Omega-B 2,0/2,5/2,6/3,0 24V <i>Trouble codes: Flash type</i>	1986-00	Bosch Motronic	682
Omega-B 2,2/2,6/3,0/3,2 <i>Trouble codes: EOBD type</i>	1999-03	Multec S(F)/Motronic/Simtec 71/GMPT-E15	672
Omega-B 2,5 TD	1994-00	Bosch EDC/MSA 11	700
Omega-B 2,5 TD	2001-03	Bosch EDC 15C4	693
Senator-B 2,6/3,0/3,0 24V	1987-93	Bosch Motronic	682
Sintra 2,2	1996-99	Bosch Motronic	682
Sintra 2,2 TD	1998-99	Bosch EDC 15M	690
Sintra 3,0	1996-99	Multec S(F)/Motronic/Simtec 71/GMPT-E15	672
Tigra 1,4/1,6 <i>Trouble codes: Flash type</i>	1995-00	Multec	669
Tigra 1,4/1,6 <i>Trouble codes: EOBD type</i>	1995-00	Multec/Simtec 56.5/70	675
Vectra-B 1,6/1,8/2,0	1995-00	Multec/Simtec 56.5/70	675
Vectra-B 1,6/1,8/2,2/2,5/2,6	1995-02	Multec S(F)/Motronic/Simtec 71/GMPT-E15	672
Vectra-B 2,0 TD/2,2 TD	1997-02	Bosch EDC 15M	690
Vectra-C 1,6	2002-04	Multec S/S(F)	705
Vectra-C 1,8	2002-04	Siemens Simtec 71.5	666
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Vectra-C 2,2 TD	2002-04	Bosch PSG 16	693
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Zafira 1,6/1,8/2,0/2,2	2000-04	Multec S(F)/Motronic/Simtec 71/GMPT-E15	672
Zafira 1,7 TD	2000-04	Denso HDRC	679
Zafira 2,0 TD/2,2 TD	1999-04	Bosch EDC 15M	690

## VOLKSWAGEN

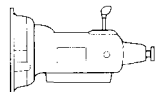
Beetle	1999-04	All systems	722
Caddy/Pickup	1995-04	All systems except: Bosch Mono-Motronic	722
Caddy/Pickup 1,6	1996-00	Bosch Mono-Motronic MA1.2.3/MA1.3	764
Corrado (08/92-95)	1992-95	All systems except: Bosch KE-Motronic	722
Corrado 2,0 16V	1992-95	Bosch KE-Motronic 1.2/1.2.1/1.2.2	769
Golf/Vento 1,4 (→07/92)	1991-92	Bosch Mono-Motronic MA1.2.2	766
Golf/Vento 1,4 (07/92→)	1992-97	Bosch Mono-Motronic MA1.2.3/MA1.3	764
Golf/Vento 1,6	1992-95	Bosch Mono-Motronic MA1.2.3/MA1.3	764
Golf/Vento 1,8 (→07/93)	1991-93	Bosch Mono-Motronic MA1.2.2	766
Golf/Vento/Bora/Cabrio	1991-04	All systems except: Bosch Mono-Jetronic/ Mono-Motronic	722
Golf/Vento/Cabrio 1,8 (07/93→)	1993-02	Bosch Mono-Motronic MA1.2.3/MA1.3	764
Jetta 2,0 16V	1989-92	Bosch KE-Motronic 1.2/1.2.1/1.2.2	769
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LT 2,5 SDI/TDI	1996-04	Bosch EDC	722
LT/4x4 2,4	03/95-96	Bosch Digifant MP4.0	775
Lupo	1998-04	All systems	722
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Passat 1,8 (→08/90) <i>Without MIL</i>	1988-90	Bosch Mono-Jetronic A2.2	759
Passat 1,8 (AAM →07/94)	06/92-94	Bosch Mono-Motronic MA1.2.2	766
Passat 1,8 (AAM, ADZ 07/94→)	1994-96	Bosch Mono-Motronic MA1.2.3/MA1.3	764
Passat 1,8 (ABS →10/93)	06/92-93	Bosch Mono-Motronic MA1.2.2	766
Passat 1,8 (ABS 10/93→)	1993-95	Bosch Mono-Motronic MA1.2.3/MA1.3	764
Passat 1,8 (RP 08/90→)	1990-91	Bosch Mono-Motronic MA1.2/MA1.2.1	761
Passat 1,8 (AAM)	1990-06/92	Bosch Mono-Motronic MA1.2/MA1.2.1	761
Passat 1,8 (ABS)	1991-06/92	Bosch Mono-Motronic MA1.2/MA1.2.1	761
Passat 2,0 16V	1988-93	Bosch KE-Motronic 1.2/1.2.1/1.2.2	769
Polo 1,05 <i>Without MIL</i>	1989-90	Bosch Mono-Jetronic A2.2	759
Polo 1,05/1,3 (→08/93)	1990-93	Bosch Mono-Motronic MA1.2/MA1.2.1	761
Polo 1,05/1,3 (08/93→)	1993-97	Bosch Mono-Motronic MA1.2.3/MA1.3	764
Polo 1,3	1990-94	All systems except: Bosch Mono-Motronic	722
Polo Classic/Estate 1,6/1,8	1995-02	Bosch Mono-Motronic MA1.2.3/MA1.3	764
Polo/Classic/Estate	1994-04	All systems except: Bosch Mono-Jetronic/ Mono-Motronic	722
Sharan	1995-04	All systems	722
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<b>VOLVO</b>			
240 2,0/2,3	1989-95	Bosch LH-Jetronic 2.4/3.2	806
440/460/480 1,6/1,7/1,8/2,0	1990-97	Fenix 3B	792
740 2,0/2,3	1989-92	Bosch LH-Jetronic 2.4/3.2	806
740/760 2,0/2,3 Turbo	1989-92	Bosch LH-Jetronic 2.4/3.2	806
850 2,0 <i>Without 16-pin DLC</i>	1995	Siemens Fenix 5.2/Bosch Motronic 1.8/4.3	810
850 2,0 <i>With 16-pin DLC</i>	1995-97	Siemens Fenix 5.2/Bosch Motronic 1.8/4.3	815
850 2,0/2,3/2,5/Turbo	1995-97	Bosch Motronic 4.4	794
850 2,0/2,5	1991-95	Bosch LH-Jetronic 2.4/3.2	806
850 2,0/2,5	1995-97	Bosch LH-Jetronic 2.4/3.2	820
850 2,3/2,5 <i>Without 16-pin DLC</i>	1993-95	Siemens Fenix 5.2/Bosch Motronic 1.8/4.3	810
850 2,3/2,5 <i>With 16-pin DLC</i>	1995-97	Siemens Fenix 5.2/Bosch Motronic 1.8/4.3	815
850 2,5 20V <i>Without 16-pin DLC</i>	1995	Siemens Fenix 5.2/Bosch Motronic 1.8/4.3	810
850 2,5 20V <i>With 16-pin DLC</i>	1995-97	Siemens Fenix 5.2/Bosch Motronic 1.8/4.3	815
850/S/V70 2,5 TDI (→08/98)	1996-98	Bosch MSA 15.7	794
940 2,0/Turbo	1990-95	Bosch LH-Jetronic 2.4/3.2	806
940 2,3 LPT	1995	Bosch LH-Jetronic 2.4/3.2	806
940 2,3 LPT	1995-98	Bosch LH-Jetronic 2.4/3.2	820
940/960 2,0/2,3/Turbo	1990-95	Bosch LH-Jetronic 2.4/3.2	806
940/960 2,0/2,3/Turbo	1995-98	Bosch LH-Jetronic 2.4/3.2	820
960 2,5 20V <i>With 16-pin DLC</i>	1996	Siemens Fenix 5.2/Bosch Motronic 1.8/4.3	815
960 2,5/3,0 <i>Without 16-pin DLC</i>	1990-95	Siemens Fenix 5.2/Bosch Motronic 1.8/4.3	810
960 2,5/3,0	1995-97	Bosch Motronic 4.4	794
C70 2,0 Turbo	2000-04	Denso/Bosch Motronic ME 7.0	800
C70 2,3 Turbo	2000-02	Denso/Bosch Motronic ME 7.0	800
C70 2,4/Turbo	2000-01	Denso/Bosch Motronic ME 7.0	800
S60 2,0/2,3 Turbo	2000-04	Denso/Bosch Motronic ME 7.0	800
S60 2,4/Turbo	2000-04	Denso/Bosch Motronic ME 7.0	800
S70/V70 2,5 20V	1997-98	Bosch LH-Jetronic 2.4/3.2	820
S80 2,0/2,3 Turbo	2000-04	Denso/Bosch Motronic ME 7.0	800
S80 2,4/Turbo	2000-04	Denso/Bosch Motronic ME 7.0	800
S80 2,8 Turbo	2000-01	Denso/Bosch Motronic ME 7.0	800
S80 2,9	2000-04	Denso/Bosch Motronic ME 7.0	800
S/V40 1,6/1,8/1,9/2,0	1996-99	Siemens Fenix 5.1/EMS 2000/Melco/Lucas	794
S/V40 1,9 TD	1996-99	Siemens Fenix 5.1/EMS 2000/Melco/Lucas	794
S/V70 2,0/2,5 20V	1997-99	Siemens Fenix 5.2/Bosch Motronic 1.8/4.3	815
S/V90 2,9	1997-98	Bosch Motronic 4.4	794
S/V/C70 2,0/2,3/2,5/Turbo	1997-98	Bosch Motronic 4.4	794
V70 2,0/2,3 Turbo	2000-04	Denso/Bosch Motronic ME 7.0	800
V70 2,4/Turbo	2000-04	Denso/Bosch Motronic ME 7.0	800
XC70 2,3/2,5 Turbo	2002-04	Denso/Bosch Motronic ME 7.0	800
XC90 2,5 Turbo	2002-04	Denso/Bosch Motronic ME 7.0	800





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## Transmission

**NOTE:** This index should be referred to for models which use a separate transmission control module (TCM). Refer to the Engine Management Systems index for models having a combined transmission control module (TCM) and engine control module (ECM) or powertrain control module (PCM).

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<b>AUDI</b>		
80	1991-97	146
80 Avant RS2	1994-95	146
80 TDI	1991-96	146
80/90 2,3	1987-94	146
100	1991-94	146
100 TDI	1990-94	146
A3	1996-02	146
A3 TDI	1996-02	146
A4	1994-02	146
A4 TDI	1994-02	146
A6	1994-02	146
A6 TDI	1994-02	146
A6 Allroad	1997-02	146
A8	1994-02	146
A8 TDI	1997-02	146
Cabriolet	1991-00	146
Cabriolet TDI	1995-00	146
Coupé/S2	1991-96	146

<b>BMW</b>		
3 Series/Compact (E36)	1991-01	180
5 Series (E34)	1991-96	180
5 Series (E39)	1996-02	180
7 Series (E32)	1987-94	180
7 Series (E38)	1994-02	180
8 Series (E31)	1994-99	180
850/CSI (E31)	1990-99	180

<b>HONDA</b>		
Accord/Aerodeck/Coupe	1993-98	351

<b>MAZDA</b>		
323 (BG)	1989-94	415
323 Estate/4x4 (BW)	1989-94	415
626/MX-6 (GE)	1992-95	415
MX-3	1994-95	415
Xedos 6	1992-95	415
Xedos 9	1994-95	415

<b>MERCEDES-BENZ</b>		
C-Class (202)	1993-00	445
E-Class (124)	1993-95	445
E-Class (210)	1995-02	445
S-Class (140)	1993-99	445
SL (129)	1993-02	445
SLK (170)	1996-02	445

<b>MITSUBISHI</b>		
Galant	1993-00	458
Shogun/Pajero	1994-00	460

<b>OPEL see VAUXHALL-OPEL</b>		
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<b>RENAULT</b>		
Clio - AT (AD4/AR4/AD8)	1991-97	530
Clio - AT (DPO)	1998-02	532
Espace - AT (DPO)	1998-02	532
Espace - AT (AD4/AR4/AD8)	1991-99	530
Laguna - AT (AD4/AR4/AD8)	1994-01	530
Laguna - AT (AD4/AD8)	1995-01	535
Laguna - AT (DPO)	1998-01	532
Mégane (DPO)	1999-02	532
Mégane D/dti (DPO)	1999-02	532
Mégane/Mégane Scénic - AT (AD4/AD8)	1995-99	535
Mégane/Mégane Scénic - AT (DPO)	1995-99	532
R19/S (AD4/AR4/AD8)	1991-96	530
R21 - AT (AD4/AR4/AD8)	1991-94	530
Safrane - AT (AD4/AR4/AD8)	1992-02	530
Safrane - AT (AD4/AD8)	1996-02	535
Scénic/4x4 (DPO)	1999-02	532
Scénic D/dTI (DPO)	1999-02	532

<b>ROVER</b>		
75	1993-99	554

<b>SAAB</b>		
900	1993-98	573
9-3	1998-02	573
9-3 TD	1998-02	573
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Model	Year	Page
<b>SEAT</b>		
Alhambra	1995-02	585
Alhambra TDI	1996-02	585
Arosa	1997-02	585
Arosa SDI/TDI	1997-02	585
Ibiza/Cordoba	1993-02	585
Ibiza/Cordoba D/TD/SDI/TDI	1993-02	585
Toledo	1991-99	585
Toledo D/TD/TDI	1994-99	585
Toledo/Leon	1999-02	585
Toledo/Leon SDI/TDI	1999-02	585

<b>SKODA</b>		
Fabia	1999-02	595
Fabia SDI/TDI	1999-02	595
Octavia	1996-02	595
Octavia SDI/TDI	1996-02	595

<b>TOYOTA</b>		
Avensis	1998-00	638
Avensis D	1998-00	638
Carina E	1992-98	636
Carina E D	1992-98	636
Celica	1985-99	640
Picnic	1996-00	642
Previa	1990-00	644
RAV4	1994-00	646

<b>VAUXHALL-OPEL</b>		
Astra-F	1991-96	709
Calibra/Turbo + 4x4	1990-98	709
Carlton/Omega	1986-94	709
Carlton/Omega-A	1988-90	709
Cavalier/Vectra-A/Turbo + 4x4	1988-95	709
Corsa-B	1993-95	709
Omega-B	1994-01	716
Senator-B	1987-93	709
Sintra	1996-99	709

Sintra TD	1998-99	709
Tigra	1995	709
Vectra-B	1995-01	714
Vectra-B TD	1997-01	714

<b>VOLKSWAGEN</b>		
Beetle	1998-02	776
Beetle TDI	1998-02	776
Corrado	1992-95	776
Golf Cabrio	1993-02	776
Golf Cabrio D/TD/TDI	1994-02	776
Golf/Bora	1997-02	776
Golf/Bora TDI	1997-02	776
Golf/Vento	1991-01	776
Golf/Vento D/TD/TDI	1991-98	776
Lupo	1998-02	776
Lupo SDI/TDI	1998-02	776
Passat	1988-02	776
Passat 1,8/2,0 16V	1989-07/90	785
Passat D/TD/TDI	1991-02	776
Polo	1993-02	776
Polo Classic/Estate	1995-02	776
Polo Classic/Estate D/SDI/TDI	1995-02	776
Polo D/SDI/TDI	1995-02	776
Sharan	1995-02	776
Sharan TDI	1995-02	776
Transporter/Caravelle	1990-02	776
Transporter/Caravelle TDI	1995-02	776

<b>VOLVO</b>		
850	1993-95	824
850	1995-97	827
850 TDI	1996-97	827
960	1990-95	824
960	1995-97	827
S/V40	1996-99	827
S/V40 TD	1996-99	827
S/V70	1997-98	827
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A2 TDI	2000-02	154
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A3 TDI	1996-02	154
A4	1994-02	154
A4 TDI	1994-02	154
A6	1994-02	154
A6 TDI	1994-02	154
A6 Allroad	1999-02	154
A8	1994-02	154
A8 TDI	1997-02	154
Cabriolet	1994-00	154
Cabriolet TDI	1994-00	154
Coupé/S2	1994-96	154
S3	1996-02	154
S4	1994-02	154
S6	1994-02	154
S8	1994-02	154
TT	1998-02	154

<b>FORD</b>		
Cougar	1997-02	330
Escort/Orion	1993-02	330
Escort 16V	1995-97	330
Escort Cosworth	1993-96	330
Escort RS 2000	1993-96	330
Fiesta	1993-02	330
Fiesta D/TD	1996-02	330
Focus	1998-02	330
Focus TD	1998-02	330
Galaxy	1995-02	330
Galaxy TD/TDI	1995-02	330
Ka	1996-02	330
Maverick/D	1996-02	330
Mondeo	1994-02	330
Mondeo TD	1996-02	330
Puma	1997-02	330
Scorpio	1994-98	330
Scorpio TD	1997-98	330
Transit	1994-01	330
Transit TD	1994-01	330

<b>MAZDA</b>		
323 (BJ)	1998-00	417
323 D/TD (BJ)	1998-00	417
323 (BA)	1995-00	417
323 D (BA)	1997-00	417
626 D (GE)	1995-97	417

Model	Year	Page
626/Estate (GF/GW)	1997-00	417
626/Estate TD (GF/GW)	1998-00	417
626/MX-6 (GE)	1995-97	417
MX-3	1995-97	417
MX-5	1994-00	417
Xedos 6	1995-00	417
Xedos 9	1995-00	417

<b>MITSUBISHI</b>		
Galant	1996-00	462
Shogun/Pajero	1996-00	462

<b>NISSAN</b>		
Almera	1996-02	484
Almera D	1996-02	484
Almera Tino	2000-02	484
Micra	1996-02	484
Primera	1996-02	484
Primera TD	1996-02	484
Serena	1996-01	484
Terrano II	1996-02	484
Terrano II TD	1996-02	484

<b>OPEL see VAUXHALL-OPEL</b>		
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<b>RENAULT</b>		
Clio	1994-02	537
Clio D Turbo	2000-01	537
Clio Williams	1994-95	537
Espace	1996-02	537
Espace dTi	1999-02	537
Espace D Turbo	1997-02	537
Extra/Rapid/Express	1996-01	537
Kangoo	1998-02	537
Kangoo D Turbo	2000-02	537
Laguna	1994-01	537
Laguna D Turbo	1999-01	537
Mégane	1999-02	537
Mégane D/Turbo	1999-02	537
Mégane dTi	1999-02	537
Mégane/Mégane Scénic	1995-99	537
Mégane/Mégane Scénic D Turbo	1997-99	537
R19	1994-96	537
R21	1994	537
Safrane	1996-02	537
Scénic	1999-02	537
Scénic D Turbo/4x4	1999-02	537
Scénic dTi	1999-02	537
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Model	Year	Page
<b>SAAB</b>		
9-3	1999-02	575
9-3 TD	1999-02	575
9-5	1997-02	575

<b>SEAT</b>		
Alhambra	1996-02	587
Alhambra TDI	1996-02	587
Arosa	1997-02	587
Arosa SDI/TDI	1997-02	587
Ibiza/Cordoba	1995-02	587
Ibiza/Cordoba D/TD/SDI/TDI	1995-02	587
Inca	1995-02	587
Toledo	1995-99	587
Toledo D/TD/TDI	1995-99	587
Toledo/Leon	1999-02	587
Toledo/Leon SDI/TDI	1999-02	587

<b>SKODA</b>		
Fabia	1999-02	596
Fabia SDI/TDI	1999-02	596
Felicia	1995-96	596
Felicia/Van/Pick-up	1996-02	596
Felicia/Van/Pick-up D	1996-02	596
Octavia	1996-02	596
Octavia SDI/TDI	1996-02	596

<b>TOYOTA</b>		
Avensis	1998-00	654
Avensis D Turbo	1998-00	654
Carina E	1995-98	652
Carina E D/Turbo	1995-98	652
Celica	1995-99	658
Corolla	1995-00	650
Corolla D	1995-00	650
MR2	1990-99	656
Picnic	1996-00	660
Picnic D Turbo	1998-00	660
Previa	1996-00	662
RAV4	1995-00	664
Starlet	1996-99	648

<b>VAUXHALL-OPEL</b>		
Astra-F	1994-98	718
Astra-G	1998-02	720
Astra-G TD	1998-02	720
Calibra	1994-98	718
Corsa-B	1994-01	718
Corsa-C	2000-02	720
Corsa-C TD	2000-02	720
Frontera	1994-98	718
Frontera-B	1999-02	720
Frontera-B TD	1999-02	720

Model	Year	Page
Omega-B	1994-99	718
Omega-B TD	1994-99	718
Omega-B	1999-02	720
Omega-B TD	1999-02	720
Sintra	1996-99	718
Sintra TD	1998-99	718
Tigra	1994-01	718
Vectra-B	1994-98	718
Vectra-B TD	1997-98	718
Vectra-B	1998-02	720
Vectra-B TD	1998-02	720
Zafira	1999-02	720
Zafira TD	1999-02	720

<b>VOLKSWAGEN</b>		
Beetle	1999-02	788
Beetle TDI	1999-02	788
Caddy	1996-02	788
Caddy D/SDI/TDI	1996-02	788
Caddy Pickup	1997-02	788
Caddy Pickup D	1996-02	788
Corrado	1994-95	788
Golf Cabrio	1994-02	788
Golf Cabrio D/TD/TDI	1994-02	788
Golf/Bora	1997-02	788
Golf/Bora TDI	1997-02	788
Golf/Vento	1994-01	788
Golf/Vento D/TD/TDI	1994-98	788
LT	1996-02	788
LT SDI/TDI	1996-02	788
Lupo	1998-02	788
Lupo SDI/TDI	1998-02	788
Passat	1994-02	788
Passat D/TD/TDI	1994-02	788
Polo	1994-02	788
Polo D/SDI/TDI	1995-02	788
Polo Classic/Estate	1995-02	788
Polo Classic/Estate D/SDI/TDI	1995-02	788
Sharan	1995-02	788
Sharan TDI	1995-02	788
Transporter/Caravelle	1995-02	788
Transporter/Caravelle TDI	1995-02	788

<b>VOLVO</b>		
850	1995-97	830
850 TDI	1996-97	830
940	1995-98	830
960	1995-98	830
S/V40	1996-00	830
S/V40 TD	1996-00	830
S/V70	1997-98	830
S/V70 TDI	1997-98	830
S/V/C70	1997-00	830



# How to use this manual

## Abbreviations

<b>AAV</b>	Auxiliary air valve	<b>ECT</b>	Engine coolant temperature (sensor)
<b>ABDC</b>	After bottom dead centre	<b>ECU</b>	Electronic control unit
<b>ABS</b>	Anti-lock brake system	<b>EDC</b>	Electronic diesel control
<b>ABV</b>	Air bypass valve	<b>EDIS</b>	Electronic distributorless ignition system
<b>ac</b>	Alternating current	<b>EDL</b>	Electronic differential lock
<b>AC</b>	Air conditioning	<b>EDU</b>	Electronic driving unit
<b>APP</b>	Accelerator pedal position (sensor/switch)	<b>EEPROM</b>	Electrically erasable programmable read only memory
<b>Approx.</b>	Approximately	<b>EFi</b>	Electronic fuel injection
<b>ARF</b>	Exhaust gas recirculation	<b>EFP</b>	Electronic accelerator pedal
<b>ASC</b>	Automatic stability control	<b>EGR</b>	Exhaust gas recirculation
<b>ASM</b>	Auto shift manual (transmission)	<b>EOBD</b>	European on-board diagnostics
<b>ASR</b>	Anti-skid regulation (same as TCS)	<b>EPC</b>	Electronic power control (same as ETS)
<b>AT</b>	Automatic transmission	<b>EPIC</b>	Electronic programmed injection control
<b>ATC</b>	Automatic temperature control (AC)	<b>EPROM</b>	Electrically programmable read only memory
<b>ATDC</b>	After top dead centre	<b>EPT</b>	Exhaust pressure transducer
<b>AWD</b>	All wheel drive	<b>ERS</b>	Electronic restraint system
<b>BARO</b>	Barometric pressure	<b>ESP</b>	Electronic stability programme
<b>BAS</b>	Brake assist system	<b>ETC</b>	Electronic traction control
<b>BBDC</b>	Before bottom dead centre	<b>ETS</b>	Electronic throttle system
<b>BDC</b>	Bottom dead centre	<b>ETV</b>	Electronic throttle valve
<b>BFP</b>	Brake fluid pressure	<b>EVAP</b>	Evaporative emission
<b>BPP</b>	Brake pedal position (switch)	<b>FL</b>	Fuse link
<b>BTDC</b>	Before top dead centre	<b>FRP</b>	Fuel rail pressure (sensor)
<b>CAN</b>	Controller area network (data bus)	<b>FT</b>	Fuel trim
<b>Cat</b>	Catalytic converter	<b>FWD</b>	Front wheel drive
<b>CDI</b>	Capacitor discharge ignition	<b>GPS</b>	Global positioning system
<b>CFi</b>	Central fuel injection	<b>HDC</b>	Hill descent control
<b>CHT</b>	Cylinder head temperature (sensor)	<b>HDI</b>	High pressure direct injection
<b>CKP</b>	Crankshaft position (sensor)	<b>HEGO</b>	Heated exhaust gas oxygen (sensor)
<b>CMP</b>	Camshaft position (sensor)	<b>HFM</b>	Hot film management
<b>CO</b>	Carbon monoxide	<b>HI</b>	High pressure
<b>CO<sub>2</sub></b>	Carbon dioxide	<b>HO<sub>2</sub>S</b>	Heated oxygen sensor
<b>CPP</b>	Clutch pedal position (switch)	<b>HT</b>	High tension
<b>CPU</b>	Central processing unit	<b>Hz</b>	Hertz (cycles per second)
<b>CVT</b>	Continuously variable transmission	<b>I/O</b>	Input-output unit
<b>DAS</b>	Drive authorisation system	<b>IAC</b>	Idle air control
<b>DDE</b>	Digital diesel electronics	<b>IAT</b>	Intake air temperature
<b>DLC</b>	Data link connector	<b>IC</b>	Integrated circuit
<b>DME</b>	Digital motor electronics	<b>ICM</b>	Ignition control module
<b>DOHC</b>	Double overhead camshaft	<b>IFS</b>	Inertia fuel shut-off (switch)
<b>DSA</b>	Dynamic stability assistance	<b>IFZ</b>	Infra-red remote control for central locking
<b>DTC</b>	Diagnostic trouble code	<b>IMA</b>	Idling mixture adjustment sensor
<b>DVM</b>	Digital volt meter	<b>ISC</b>	Idle speed control
<b>EBD</b>	Electronic brake pressure distribution	<b>J1930</b>	Standard terminology for automotive applications
<b>ECi</b>	Electrically controlled injection	<b>KAM</b>	Keep alive memory
<b>ECM</b>	Engine control module		

## How to use this manual

<b>km/h</b>	Kilometres per hour
<b>LCD</b>	Liquid crystal display
<b>LED</b>	Light emitting diode
<b>LH</b>	Left-hand
<b>LHD</b>	Left-hand drive
<b>LO</b>	Low pressure
<b>LOS</b>	Limited operating strategy
<b>LPG</b>	Liquefied petroleum gas
<b>mA</b>	Milli-amps
<b>MAF</b>	Mass air flow (sensor)
<b>MAP</b>	Manifold absolute pressure (sensor)
<b>Max.</b>	Maximum
<b>MFI</b>	Multi-port fuel injection
<b>MIL</b>	Malfunction indicator lamp
<b>Min.</b>	Minimum
<b>mph</b>	Miles per hour
<b>MPI</b>	Multi-point injection
<b>ms</b>	Milli-second
<b>MT</b>	Manual transmission
<b>MTC</b>	Manual temperature control (AC)
<b>mV</b>	Milli-volt
<b>MY</b>	Model year (usually starts Aug/Sept before calendar year)
<b>N</b>	Neutral position, automatic transmission
<b>NATS</b>	Nissan anti-theft system
<b>nda</b>	No data available
<b>NOx</b>	Nitrogen oxides
<b>NP</b>	Neutral position (switch)
<b>NTC</b>	Negative temperature coefficient
<b>O2S</b>	Oxygen sensor
<b>OBD</b>	On-board diagnostics
<b>OHC</b>	Overhead camshaft
<b>P</b>	Park position, automatic transmission
<b>PAIR</b>	Pulsed secondary air injection
<b>PAS</b>	Power assisted steering
<b>PATS</b>	Passive anti-theft system
<b>PCM</b>	Powertrain control module (ECM + optional TCM function)
<b>PCV</b>	Positive crankcase ventilation
<b>PGM-FI</b>	Programmed fuel injection
<b>PMS</b>	Pressure management system
<b>PNP</b>	Park/neutral position (switch)
<b>PS</b>	Power steering
<b>PSP</b>	Power steering pressure (switch)
<b>PTC</b>	Positive temperature coefficient
<b>quattro</b>	All wheel drive
<b>R-Cat</b>	Regulated catalytic converter
<b>RAM</b>	Random access memory
<b>RH</b>	Right-hand

<b>RHD</b>	Right-hand drive
<b>ROM</b>	Read only memory
<b>RPM</b>	Revolutions per minute
<b>RWD</b>	Rear-wheel drive
<b>secs.</b>	Seconds
<b>SEFI</b>	Sequential electronic fuel injection
<b>SFI</b>	Sequential fuel injection
<b>Single zone</b>	Common temperature control for all areas of vehicle
<b>SPI</b>	Single point injection
<b>SPS</b>	Speed sensitive power steering
<b>SRS</b>	Supplementary restraint system
<b>STO</b>	Self test output
<b>TBI</b>	Throttle body injection
<b>TC</b>	Turbocharger
<b>TCCS</b>	Toyota computer control system
<b>TCM</b>	Transmission control module
<b>TCS</b>	Traction control system
<b>TD</b>	Turbo diesel
<b>TDC</b>	Top dead centre
<b>TDI</b>	Turbo direct injection
<b>TFP</b>	Transmission fluid pressure
<b>TFT</b>	Transmission fluid temperature
<b>TP</b>	Throttle position
<b>TPM</b>	Tempomat cruise control
<b>TPS</b>	Throttle position switch/sensor
<b>TR</b>	Transmission range (sensor/switch)
<b>TRAC</b>	Traction control
<b>TRC</b>	Traction control
<b>TWC</b>	Three-way catalytic converter
<b>VAF</b>	Volume air flow (sensor)
<b>VAG</b>	Volkswagen Aktiengesellschaft (Volkswagen group Ltd.)
<b>VICS</b>	Variable intake control system
<b>VIS</b>	Variable intake system
<b>VP</b>	Diesel injection pump (axial type)
<b>VR</b>	Diesel injection pump (radial type)
<b>VRIS</b>	Variable resonance intake system
<b>VSS</b>	Vehicle speed sensor
<b>VSV</b>	Vacuum switching valve
<b>WOT</b>	Wide open throttle
<b>8V</b>	Eight valve
<b>10V</b>	Ten valve
<b>16V</b>	Sixteen valve
<b>20V</b>	Twenty valve
<b>24V</b>	Twenty four valve
<b>2WD</b>	Two-wheel drive
<b>4WD</b>	All-wheel drive
<b>4x4</b>	Four-wheel drive

# How to use this manual

## General test conditions

Find the model related chapter from vehicle manufacturer, model name, engine code, year of manufacture and system.

### Observe the following relevant test conditions:

- All auxiliary equipment, including air conditioning, switched OFF.
- Ensure battery voltage above 11 volts.
- Ensure earth wires in good condition.
- If vehicle fitted with engine malfunction indicator lamp (MIL):
- Check MIL operation – if MIL does not flash or illuminate, replace bulb or repair circuit.

**NOTE:** If MIL remains illuminated or flashes, this indicates a fault, but if it goes out there could still be trouble codes logged in the ECM. Scan tool may not respond if MIL is not working.

- Engine at normal operating temperature.
- Carry out road test.
- Ensure overrun cut-off function operates several times.
- Operate accelerator pedal several times over complete travel range.
- Allow engine to idle.
- If engine does not start: Briefly crank engine and leave ignition switched ON.
- Observe any model specific information.
- Find the location of the data link connector (DLC).
- Bridge DLC terminals, connect an LED tester or scan tool, as appropriate and observe any special conditions. If a scan tool is used, follow the manufacturer's operating instructions.
- Follow procedure for accessing trouble codes and note any codes displayed.

**NOTE:** The trouble code may not identify the exact cause of any problem, but serves as a guide to the component or system to be investigated.

- Refer to probable causes and carry out systematic check of components and circuits until cause of problem is identified and rectified. Refer to Autodata CD or engine management and pin data manuals, for further test and diagnosis information.

**NOTE:** Where the probable cause is a non-specific engine fault, fuel system or ignition system fault, refer to General Trouble Shooter section.

- Check for further trouble codes.
- Follow procedure for erasing trouble codes.

**NOTE:** If the battery is disconnected to erase trouble codes, data stored, such as radio security codes and ECM adaptive memory may be lost.

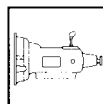
- Road test vehicle and recheck for any logged trouble codes.
- If a trouble code is output, but not listed in the appropriate code table, suspect a control module fault.

**NOTE:** In the case of signal or component malfunction, the ECM will substitute a fixed value from its internal limited operating strategy (LOS) software. This enables the vehicle to be driven in limp-home mode until the fault can be rectified. Depending on the component or circuit in question, it may not be obvious to the driver that the engine management system is operating in limp-home mode.

### Quick reference icon



Engine management



Transmission



Immobilizer

### Quick reference icon

### Model identification and engine size

### Production year range

### Engine identification code

### Manufacturer's system name

### Data link connector (DLC) location(s)

### System

Model: Sierra 1,8 • Sierra 2,9 V6  
Granada/Scorpio 2,4/2,9 V6 • Transit 2,9 V6

Year: 1986-95

Engine code: ARD, BRD, BRE, BRF, BRT, BRV, B4B, B4C, R6A

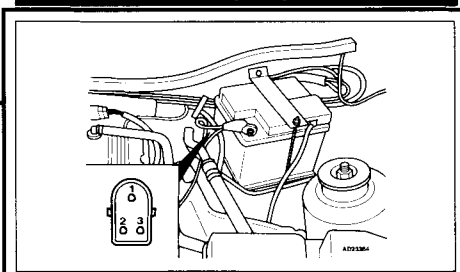
System: Ford CF/EEC IV

FORD

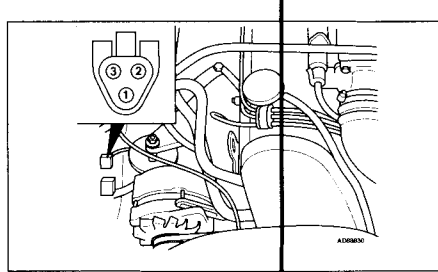


Engine management/transmission

### Data link connector (DLC) locations



Sierra/Granada/Scorpio - 1986-1989



Transit - 1990-1995



# How to use this manual

## Test connections

## Illustration reference number

## Identification of trouble code access method(s) conditions

## Procedure for accessing trouble codes

## Format of trouble code output

## Illustration key number

### Trouble codes

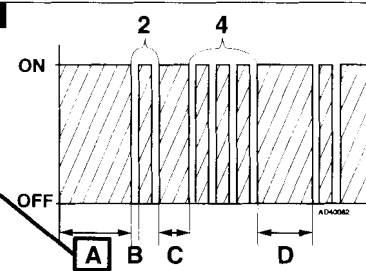
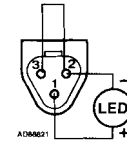
**NOTE:** Engine control module (ECM) incorporates transmission control function.

#### General information

- Refer to general test conditions at the front of this manual.
- Trouble codes are displayed by using an LED connected to the data link connector.
- The ECM fault memory can also be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Accessing

- Engine at normal operating temperature.
- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 2 and 3.
- Connect LED test lamp negative connection to DLC terminal 2 **1**.
- Connect LED test lamp positive connection to DLC terminal 1 **1**.
- Switch ignition ON.
- Check that LED illuminates.
- Trouble codes are displayed after 10-25 seconds **2** **[A]**.
- Note trouble codes. Compare with trouble code table.
- Trouble codes are displayed by illuminated LED switching OFF for approximately 1 second **2** **[B]**.
- Each trouble code consists of two groups. LED illuminates for approximately 2 seconds between each group **2** **[C]**.
- NOTE:** Trouble codes ending in '0' are displayed with only 1 group.
- LED illuminates for approximately 5 seconds between each trouble code **2** **[D]**.
- Trouble code(s) are displayed twice.



## Procedure for erasing trouble codes

## Identification of trouble code type

## Trouble code number

## Primary fault location and associated fault(s)

## Probable causes of fault

### Erasing

- Ensure ignition switched OFF.
- Disconnect engine control module (ECM) harness multi-plug.

### Trouble code identification

Flash type	Fault location	Probable cause
11	Crankshaft position (CKP) sensor/engine speed (RPM) sensor/camshaft position (CMP) sensor - incorrect signal	Wiring, CKP/RPM/CMP sensor, ECM
12	Mass air flow (MAF) sensor - voltage high	Wiring, MAF sensor, ECM
13	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
14	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
15	Throttle position (TP) sensor	Wiring, TP sensor, ECM
16	Volume air flow (VAF) sensor 2	Wiring, VAF sensor, ECM
43	Throttle position (TP) sensor - voltage low/high	Wiring, TP sensor, ECM
55	No fault found	-

# How to use this manual

## Terminology

- Throughout this manual the following standard descriptions and terminology have been used, together with J1930 component descriptions.
- Left-hand (LH) and right-hand (RH) – As seen from the driver's seat facing forward
- Bank 1 – Cylinder bank or group including No.1 cylinder (e.g. cylinders 1, 2 & 3 of a six cylinder engine)
- Bank 2 – Cylinder bank or group not including No.1 cylinder (e.g. cylinders 4, 5 & 6 of a six cylinder engine)
- HO2S 1 – Heated oxygen sensor (HO2S) single or nearest to engine (in front of catalytic converter)
- HO2S 2 – Heated oxygen sensor (HO2S) after catalytic converter
- KS 1 – Knock sensor (KS) single or nearest No.1 cylinder

## Typical sensor locations and descriptions:

Fig. 1

### 4 cylinder in-line

- 1 Heated oxygen sensor (HO2S) 1
- 2 Heated oxygen sensor (HO2S) 2
- 3 Knock sensor (KS) 1
- 4 Knock sensor (KS) 2
- 5 Catalytic converter

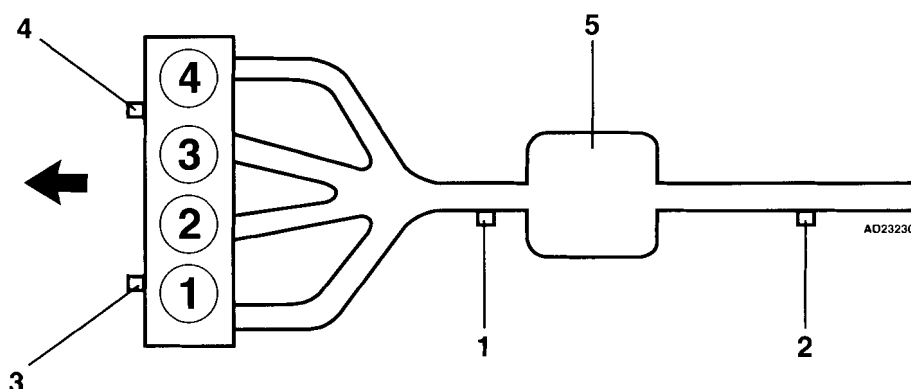
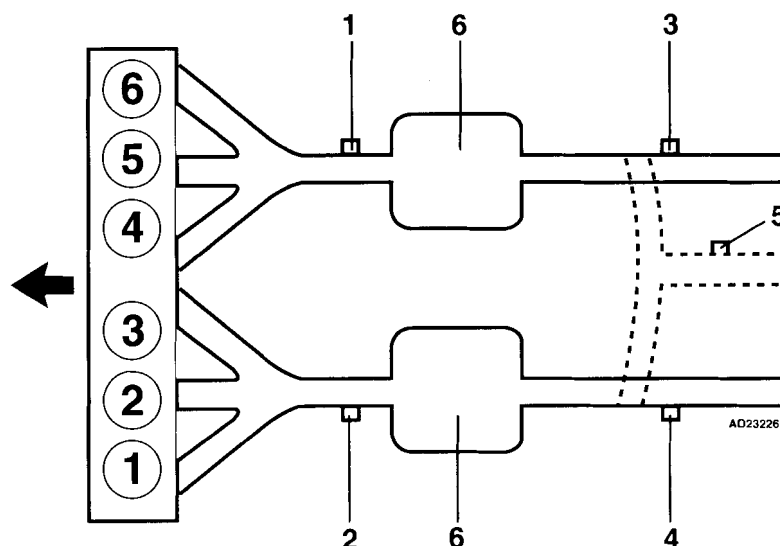


Fig. 2

### 6 cylinder in-line

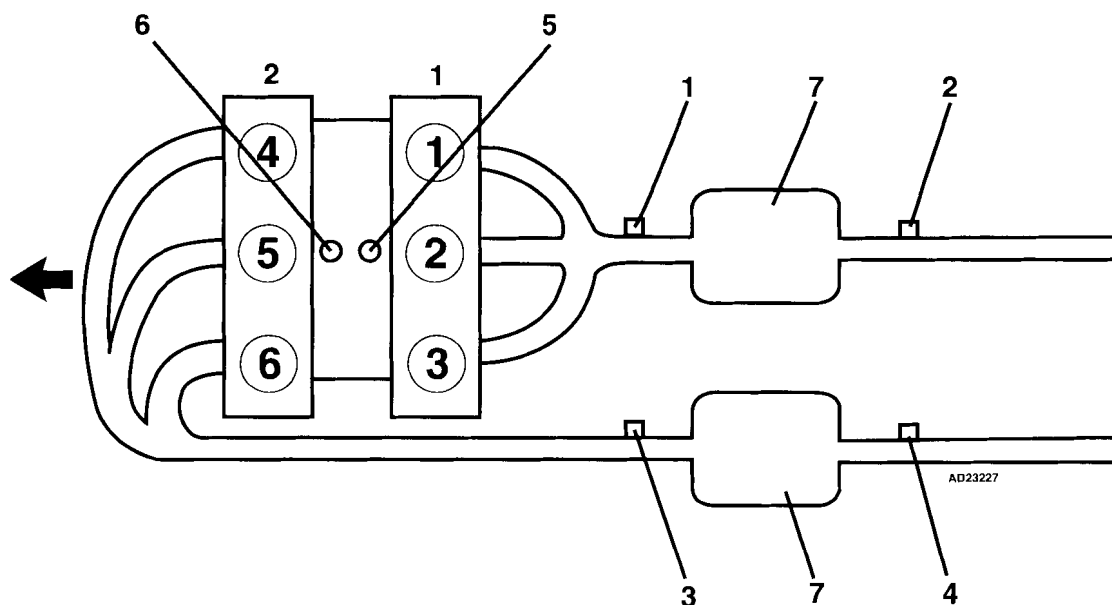
- 1 Heated oxygen sensor (HO2S) 1, bank 2
- 2 Heated oxygen sensor (HO2S) 1, bank 1
- 3 Heated oxygen sensor (HO2S) 2, bank 2
- 4 Heated oxygen sensor (HO2S) 2, bank 1
- 5 Heated oxygen sensor (HO2S) 2 (if only single heated oxygen sensor (HO2S) after cat)
- 6 Catalytic converter



**Fig. 3**

**V6**

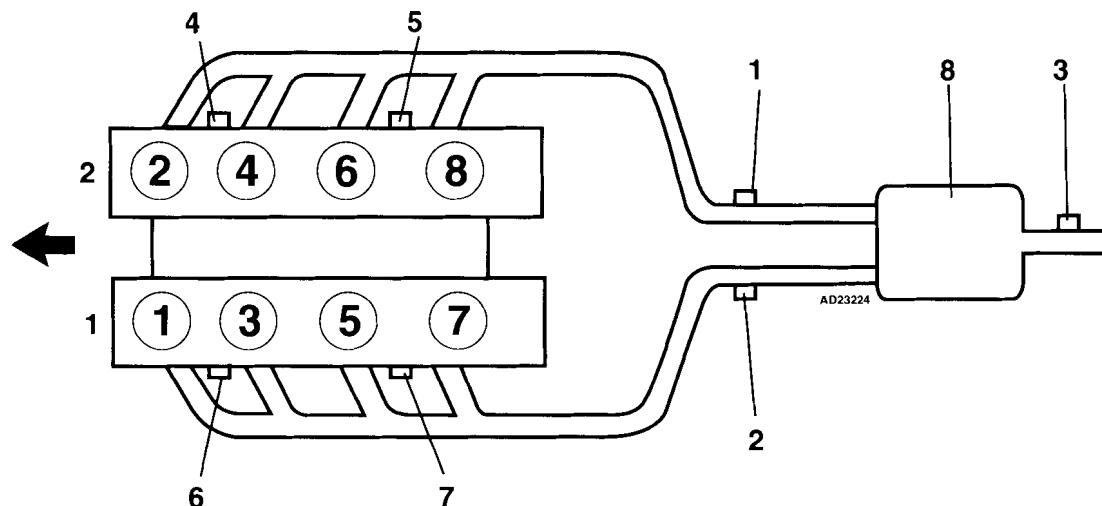
- 1 Heated oxygen sensor (HO2S) 1, bank 1
- 2 Heated oxygen sensor (HO2S) 2, bank 1
- 3 Heated oxygen sensor (HO2S) 1, bank 2
- 4 Heated oxygen sensor (HO2S) 2, bank 2
- 5 Knock sensor (KS) 1
- 6 Knock sensor (KS) 2
- 7 Catalytic converter



**Fig. 4**

**V8**

- 1 Heated oxygen sensor (HO2S) 1, bank 2
- 2 Heated oxygen sensor (HO2S) 1, bank 1
- 3 Heated oxygen sensor (HO2S) 2
- 4 Knock sensor (KS) 1, bank 2
- 5 Knock sensor (KS) 2, bank 2
- 6 Knock sensor (KS) 1, bank 1
- 7 Knock sensor (KS) 2, bank 1
- 8 Catalytic converter



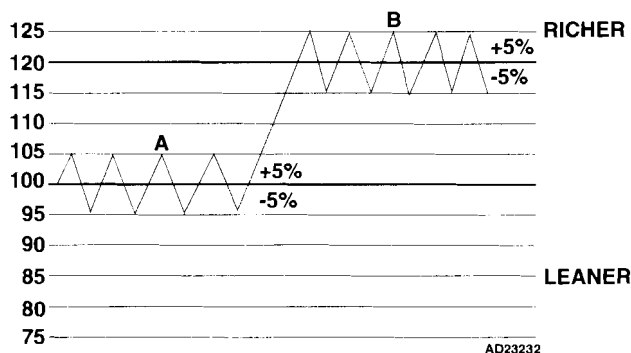
# How to use this manual

## Fault location

### Fuel trim – Fig. 5

- Short and long term fuel trim refers to the strategy used to reduce exhaust emissions after the basic computation of injection period, using engine load as the major parameter.
- Both front and rear oxygen sensor signals are used to fine tune the fuel/air mixture by increasing or decreasing the injection period  $\pm 25\%$  above or below the basic level.
- Any fault requiring a correction beyond this level will result in a trouble code being logged.
- When the engine is new and running satisfactorily a level of fuel trim will be established – represented by 100%.
- The fuel trim will oscillate the injection period  $\pm 5\%$  above and below the mean level [A].
- Manufacturing and in-service tolerances of load sensors (MAP, MAF or VAF) and injectors in particular and faults such as intake air leaks will affect the fuel/air mixture and cause the fuel trim to quickly compensate.
- An intake air leak for instance would result in the injection period increasing, for example to 115-125%. This level will also oscillate  $\pm 5\%$  as before [B].
- This new short term fuel trim (STFT) level will be stored in the ECM if it is established as a new basic mixture level. It will then become a long term fuel trim (LTFT) correction and results in the correct mixture level immediately after starting, even when the HO2S has had insufficient time to heat up.
- Long term fuel trim (LTFT) values can be erased by disconnecting the ECM power supply for a suitable length of time.
- If the memory is not erased after repairs the ECM will eventually learn the new LTFT values, but this will take some time and probably cause high emissions and some driveability problems.
- For example if an intake air leak causes the engine to run lean this will be compensated by a change in the LTFT value, which will be stored in the ECM memory.
- After the leak has been repaired this memorised LTFT value will still be used to compute the injection period, resulting in excessively rich running, until new LTFT values have been learned.

Fig. 5



## Probable causes

### Wiring

- Wiring – refers not only to the wiring harness, but also to any associated component multi-plugs, relay plates, welded, crimped or soldered joints and bulkhead connectors.
- Short to earth – refers to wiring that has a 'leak' to earth somewhere along its length e.g. if the insulation has chaffed through and the wiring is in contact with the body or engine.
- Short to positive – refers to wiring that would normally not be carrying 12 volts, but is shorted to the 12 volt supply e.g. a sensor wire that would normally be fed with approx. 5 volts from the ECM, shorted to a 12 volt battery positive supply.
- Open circuit – refers to wiring that is either disconnected or broken, but is not shorted to either earth or a positive supply.
- Poor connection – refers to a loose, intermittent or high resistance connection.

### General faults

Despite the sophistication of modern electronic management systems, basic mechanical faults can still cause unsatisfactory starting, running and driveability.

Before assuming that a problem is an electronic one, it should be established that the engine/transmission/immobilizer is in good mechanical condition and that the basic fuel and electrical circuits are OK.

Check the following:

### Engine

#### Mechanical

- Compression pressure
- Manifold vacuum
- Valve clearances
- Valve timing
- Oil filler cap sealing
- Not burning excess oil
- No excessive crankcase fumes

#### Electrical

- Battery fully charged and 11-14 volts available
- Plug leads connected correctly
- Ignition coil(s)
- Ignition timing
- HT leads (where applicable)
- Spark at plugs
- Engine ground connections
- Engine control module (ECM) ground connections

#### Fuel system

- Air filter for blockage
- Fuel filter for blockage
- Fuel delivery rate
- Fuel system pressure
- Fuel regulated pressure
- Fuel injector spray pattern
- Vacuum hoses not split or collapsed
- Catalytic converter and exhaust for blockage

### Transmission

- Fluid level correct
- Fluid in good condition
- No foreign matter in transmission fluid
- No restricted fluid passages in valve block
- Vacuum hoses not disconnected, split, blocked or collapsed
- No engine related faults
- Selector lever cable/linkage adjusted correctly
- Multi-plugs connected securely
- Wiring undamaged

### Immobilizer (engine won't start)

- Correct key is being used
- Key is not damaged
- Does the key need reprogramming
- No spurious signals from external source
- No engine related faults
- Gear selector in P or N



# Safety precautions

## Airbags (Supplementary Restraint System – SRS)

Many of the models covered by this manual are fitted with airbags as standard equipment. When working on a vehicle fitted with such a system, extreme caution must be taken to avoid accidental firing of the airbag, which could result in personal injury.

Unauthorised repairs to the system could render it inoperative, or cause it to inflate accidentally.

**NOTE:** *All related wiring is encased in a yellow outer covering.*

When the engine is started the AIRBAG warning lamp should go out after approximately 5-10 seconds, if not this indicates a fault in the system. The system should be checked and the fault corrected by a competent technician before any other work is undertaken.

- NEVER attempt to test the system using a multi-meter.
- NEVER tamper with or disconnect the airbag wiring harness.
- NEVER make extra connections to any part of the system wiring harness or terminals.
- ALWAYS ensure that the airbag wiring harness has not been trapped or damaged in any way when working on adjacent components or systems.

## Electrical

**CAUTION:** *To prevent the engine starting and to avoid damaging the catalytic converter(s), disconnect the fuel injector valve multi-plug(s) before cranking tests.*

- ALWAYS ensure that the battery is properly connected before attempting to start the engine.
- DO NOT attempt to start the engine using a source in excess of 12 volts, such as a fast charger (16 volts) or by connecting two batteries in series (24 volts). ALWAYS disconnect the battery before charging it.
- DO NOT disconnect the battery while the engine is running.
- DO NOT connect the battery with reverse polarity.
- DO NOT disconnect or touch the HT leads when the engine is being cranked or when it is running.
- DO NOT connect or disconnect the electronic control module (ECM), or any other component of the fuel injection system while the ignition is switched ON.
- DO NOT disconnect ECM multi-plug within 30 seconds of switching ignition OFF.
- DO NOT connect or disconnect multi-meters, voltmeters, ammeters or ohmmeters with the ignition switched ON.
- DO NOT reverse the polarity of the fuel pump.
- ALWAYS ensure that all electrical connections are in good condition and making good contact, PARTICULARLY the ECM connector.
- ALWAYS disconnect the ignition coil, ECM, fuel pump relay/fuse before carrying out a compression test.
- DO NOT flash a wire or circuit to ground to check that continuity exists.
- Modern ignition systems operate at very high voltages and these high voltages can severely damage transistorised components such as a wrist-watch if electrical contact is made. Wearers of heart pacemaker devices, therefore, should not at any time carry out work involving ignition systems. In addition to the danger from electric shock, further hazards can arise through sudden uncontrolled body movement causing involuntary contact with moving parts of the engine, i.e. fan blades, pulleys and drive belts.
- ALWAYS ensure that any replacement fuel or ignition system parts are correct for the application in question. Many units share common external features, but differ internally.

## Mechanical

**CAUTION:** *To minimise fire risk, fuel system must be depressurised before disconnecting any fuel lines or fuel system components.*

- ALWAYS disconnect the distributor before carrying out a fuel pump pressure or delivery check.
- AVOID the risk of fire – ALWAYS disconnect the ignition coil supply and ground the coil HT lead, so that NO HT spark can be emitted, before checking the fuel injector valves, or any other component of the fuel injection system likely to result in the presence of fuel in or around the engine bay.
- AVOID the risk of fire – NEVER work on the fuel injection system when SMOKING or close to a NAKED FLAME.
- ALWAYS keep a fire extinguisher close at hand when working on the fuel injection system.
- ALWAYS ensure that test equipment, leads, tools and especially items of clothing, are clear of moving parts and are not liable to fall into the engine bay, due to vibration, when the engine is running.

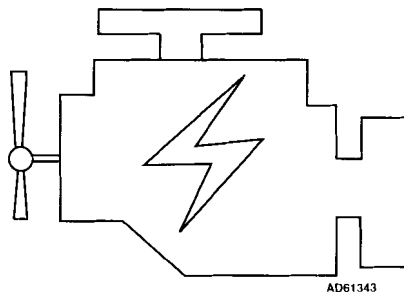


# Tools & equipment

## Code readers and scan tools

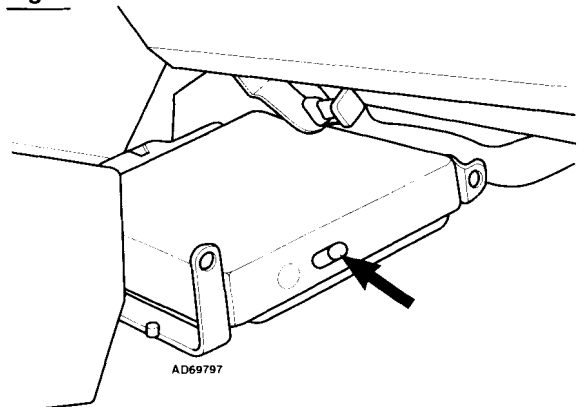
- The method of fault code output varies considerably from manufacturer to manufacturer. The simplest to access are flash type codes displayed with the malfunction indicator lamp (MIL) on the instrument panel **Fig. 1** or an LED display on the control module **Fig. 2** – these do not require any special equipment.
- Systems requiring special tools or equipment may output fault memory data as numerical codes or as plain text messages.
- Many different types of diagnostic equipment are available for reading self-diagnosis fault memories.
- These vary from simple LED based testers, for reading flash type codes, to software based scan tools fully compatible with EOBD requirements and incorporating many additional features, including the facility to be connected to a PC and printer.
- Some flash type codes are very complex, with up to ten flashes per group and four or five groups of digits, so that reading them accurately with an LED tester is difficult and the possibility of miscounting is quite likely.
- Some code readers can only display numerical codes, which means that they are unsuitable for use on certain makes and models (such as Renault, Rover, Fiat etc.). These require equipment capable of displaying fault descriptions in plain text.
- Most scanner tools will enable fault codes to be erased without disconnecting the battery, therefore avoiding the loss of radio codes and control module learnt values.
- Any software based equipment will need to be updated periodically by replacement 'pods' or CDs provided by the equipment manufacturers.
- Additional features accessible with the more sophisticated testers include:
  - ☐ Activation and functional testing of specific actuators and sensors.
  - ☐ Multi-meter ranges.
  - ☐ Recording and displaying oscilloscope patterns.
  - ☐ Links to menu based fault diagnosis procedures, with wiring diagrams, technical data and fault finding flow charts.

**Fig. 1**



**Instrument panel malfunction indicator lamp (MIL)**

**Fig. 2**



**Control module with LED indicator**

## Fault diagnosis and testing methods

### General recommendations

- Electronic control modules such as the engine control module (ECM), transmission control module (TCM) and immobilizer control module need special care during fault diagnosis. They are easily damaged by excess voltage or reversed polarity. Whenever possible disconnect them before testing wiring continuity.
- Some ECMs have an adaptive memory which may have to re-learn its basic dynamic values (during driving) if the power supply is interrupted, for instance to erase fault codes.
- Electrical wiring can be repaired where practicable but ensure that all repairs are properly insulated, preferably with heat shrink tubing and protected by a fuse of the correct amperage.

**NOTE:** Many electronic control modules have fault memories which may be erased if the power supply is interrupted.

- Check condition of ALL fuses in the system prior to circuit testing.

## Test equipment

### Multi-meter types

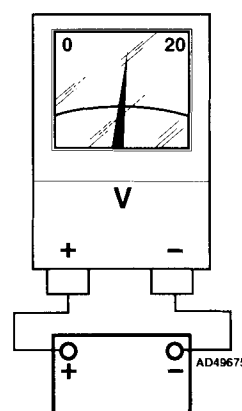
- The majority of electrical faults identified in this manual can be successfully diagnosed using an ohmmeter or voltmeter. Normally these functions will be combined in a multi-meter.
- A high impedance (10 K ohms/volt minimum) multi-meter that includes a 0-20 V voltage scale and a low (0-200) and high (0-20 K) range ohm scale is recommended for measuring the voltage and resistance of the system components.
- Analogue meters (with a needle sweeping across a numerical scale), due to their continuous readout are useful for certain applications, such as counting needle deflections to identify fault codes on certain models and the identification of intermittent faults, but for general workshop use a digital meter is easier to use and is more resistant to rough handling and less likely to be damaged by incorrect use.
- Digital meters (with an LED or LCD display), are available in many different types. In addition to the basic, general purpose meters with voltage (DC/AC), resistance and amperage scales additional features such as temperature, duty cycle and engine RPM etc. are often incorporated in dedicated test meters for automobile applications.

### Using multi-meters

#### Voltage checking – Fig. 3, Fig. 4, Fig. 5 & Fig. 6

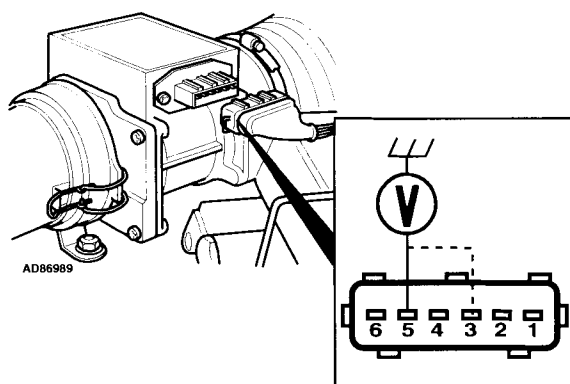
- Set the meter to VOLTAGE.
- If applicable, set the meter to the correct scale e.g. AC/DC, V/mV etc. (most modern meters are self-ranging).
- Connect the black test lead to the negative terminal being tested.
- Observe the conditions of the test, e.g. ignition ON etc.
- Connect the red test lead to the positive terminal being tested.
- Read and record the value displayed.
  - Measurement of voltage drop through cables and components can be a useful diagnostic tool, as any abnormal condition will have an effect on the operation of the circuit(s) and components involved.
  - The multi-meter should be set to measure milli-volts and the circuit should be in its normal operating mode e.g. all multi-plugs connected and current flowing.
  - Maximum voltage drop should not exceed the following values:
    - Control module harness wire – 200 mV
    - Switch – 300 mV
    - Earth connection – 100 mV
    - Sensor connection – 50 mV

Fig. 3



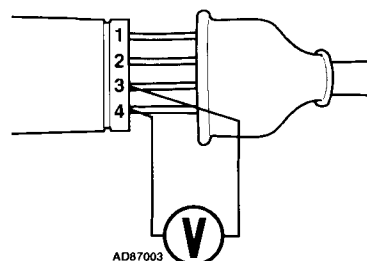
Checking voltage with multi-meter

Fig. 4



Checking supply voltage – harness multi-plug disconnected

Fig. 5



Checking signal voltage between wires – harness multi-plug connected



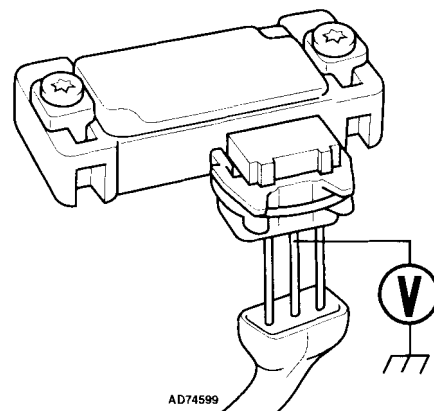
## Resistance and continuity checking – Fig. 7, Fig. 8, Fig. 9 & Fig. 10

- ❑ High resistance in earth connections can cause unusual (and apparently illogical) symptoms that are seemingly unconnected with the components involved.
- ❑ Earth connections should be thoroughly cleaned and treated with a proprietary contact cleaner before assembly.
- ❑ Connections in the vicinity of the battery are particularly vulnerable to corrosion.
- ❑ Earth wires should be checked along their whole length for chafing, corrosion and mechanical damage. A typical earth wire may have 20-30 strands and although there will still be a connection if only a few of these are intact, the resulting high resistance will cause problems.
- ❑ Suspect multi-plugs should be 'dismantled' (if possible) and the terminals thoroughly inspected and cleaned.
- Set the meter to RESISTANCE.
- If applicable, set the meter to the correct scale (most modern meters are self-ranging).
- Connect the black test lead to the red test lead and check that the meter displays ZERO  $\Omega$ .

**NOTE: If ZERO  $\Omega$  is not displayed, refer to the meter operating instructions.**

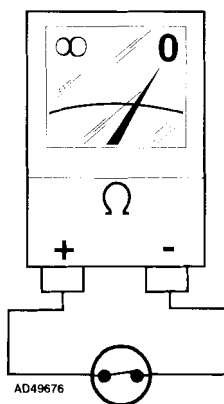
- Disconnect the component from any wiring.
- Connect the black test lead to one terminal being tested.
- Connect the red test lead to the other terminal being tested.
- Read and record the value displayed.
- If the meter displays ZERO, **Fig. 7** this indicates continuity.
- If the meter displays  $\infty$  (infinity) **Fig. 8**, this indicates NO continuity (open circuit).

**Fig. 6**



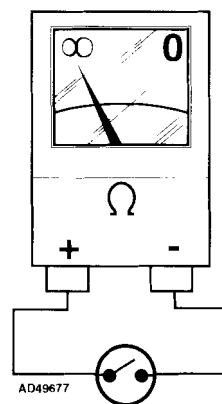
**Checking signal voltage between wire and earth – component multi-plug connected**

**Fig. 7**



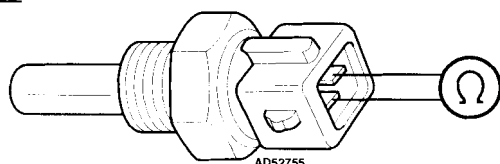
**Circuit continuity**

**Fig. 8**



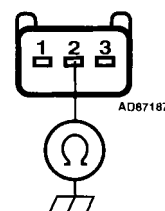
**Open circuit**

**Fig. 9**



**Checking component resistance**

**Fig. 10**



**Checking earth connection at harness multi-plug**

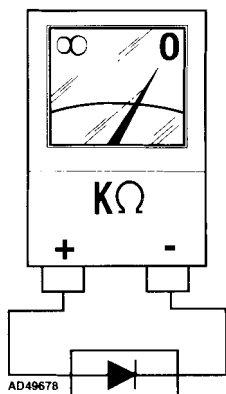
## Tools & equipment

### Diode checking – Fig. 11 & Fig. 12

- Set the meter to RESISTANCE or DIODE.
- Connect the red test lead to positive terminal of the diode.
- Connect the black test lead to the negative terminal of the diode.
- The meter should display continuity Fig. 11.
- Reverse the test leads, the meter should display NO continuity Fig. 12.

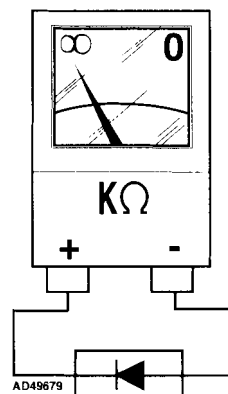
**NOTE:** If the meter displays continuity in both tests the diode is faulty.

Fig. 11



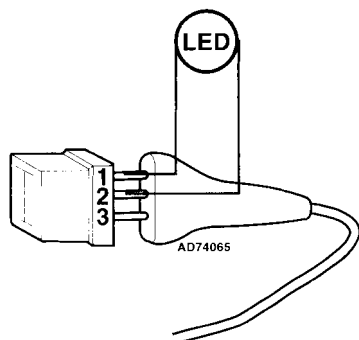
Continuity through diode

Fig. 12



No continuity through diode

Fig. 13



Checking sensor signal with LED tester – multi-plug connected

### Signal checking with LED tester – Fig. 13

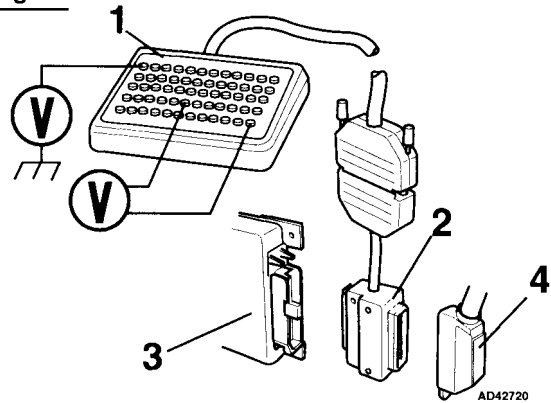
**CAUTION:** Circuit testers incorporating a bulb should not be used on electronic circuits as the high current involved could damage sensitive components.

- LED testers can be used safely on electronic circuits as their low current consumption cannot damage electronic components.
- They are particularly useful where a pulse or intermittent signal is being checked.
- Most LED testers are in the form of a probe attached to the tester body, with a test lead and clip for the other terminal. The more sophisticated testers have different coloured LEDs to indicate polarity.

## Breakout box – Fig. 14

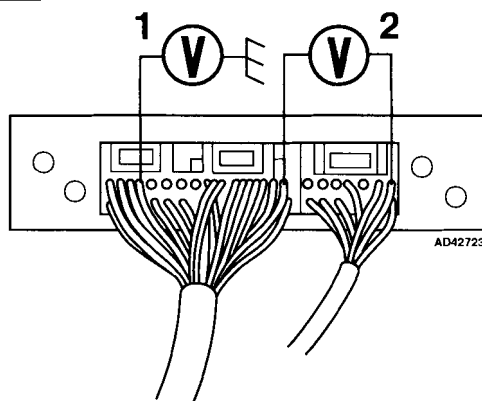
- Whenever possible a breakout box should be used for circuit testing at the control module multi-plug and when checking pin data.
- A breakout box [1] is a means of connecting test equipment to the control module harness without the need to probe into the back of the harness multi-plug. For checking pin data it is connected by an adaptor lead [2], between the ECM [3] and the car's wiring harness [4].
- For circuit testing the harness multi-plug is disconnected from the control module and connected to the breakout box.
- The pin connections are laid out in rows in numerical order and have large connecting sockets, enabling test leads to be securely plugged into a circuit, and avoiding the possibility of connecting to the incorrect pin, due to miscounting.
- The possibility of damaging components or wiring, due to shorting live pins to ground or to other components, is also much reduced.
- The limiting factor is the range of adaptor leads. Several equipment manufacturers produce breakout boxes, but none are able to supply a complete range of leads to cover all the models included in this manual.

Fig. 14



Breakout box connections

Fig. 15

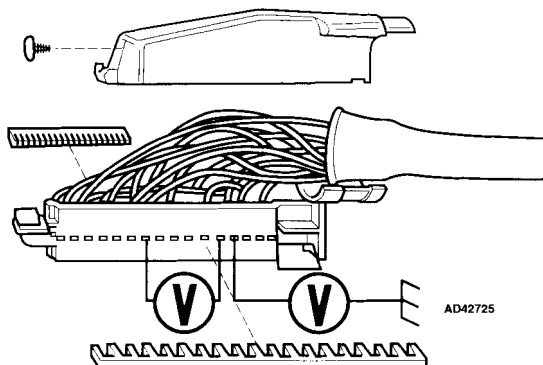


Testing at wire side of harness multi-plug

## ECM harness multi-plug testing – Fig. 15

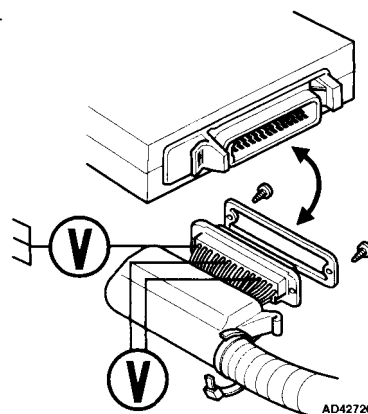
- If a breakout box and suitable adaptor leads are not available, testing must be carried out at the wire side of the ECM harness multi-plug Fig. 15.
- To access the terminals the protective cover must be removed from the plug. Many different types of plug are used for engine management wiring harnesses and two examples are shown in Fig. 16 and Fig. 17.
- Use the appropriate ECM harness multi-plug – wire side diagram and identify the pin(s) to be tested – refer to Autodata CD2 or Pin Data manual.
- Use only very fine test probes to access the connections and measure the signal between the pin and earth Fig. 15 [1], or between two ECM pins Fig. 15 [2].

Fig. 16



Testing at harness multi-plug

Fig. 17



Testing at harness multi-plug

# Oscilloscope testing

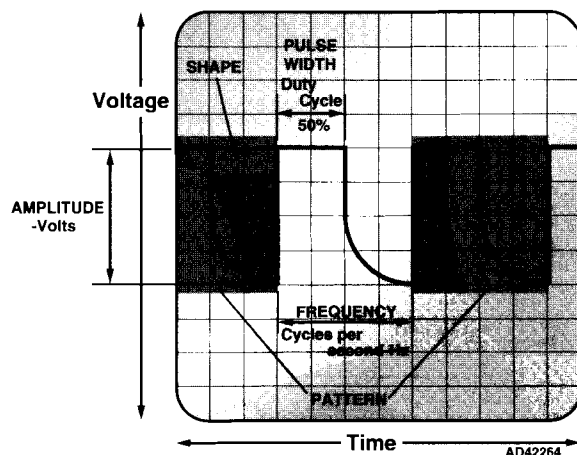
## Oscilloscopes

- Digital multi-meters are entirely satisfactory for checking circuits in a static condition and for instances where any change in reading is a gradual one, but for dynamic checking and the diagnosis of intermittent faults, the oscilloscope is a very powerful workshop tool.
- Unlike older analogue oscilloscopes dedicated to HT ignition testing, a modern digital oscilloscope has a variable voltage scale, enabling low voltages (typically 0-5 V or 0-12 V) to be displayed and also an adjustable time scale, enabling any wave form to be displayed in the ideal manner.
- Most oscilloscopes designed for automotive use can be hand-held and are therefore ideal for use in the workshop. They can also be used inside the car, while the vehicle is driven, to capture dynamic data.
- Usually it is possible to store wave forms and associated data in an internal memory and then print out or download the information onto a PC, enabling the scope patterns to be studied in detail.
- The oscilloscope display can show the amplitude, frequency, pulse width, shape and pattern of the signal received, by effectively drawing a graph of voltage (vertically) and time (horizontally).
- It is easy to connect (normally just two leads) and the speed of sampling can be far in excess of even the best of digital multi-meters.
- This fast response time enables diagnosis of intermittent problems and also enables the effect of disturbing parts of the system to be observed. When necessary, the response time can be slow enough to display signals such as the throttle position sensor.
- Once the cause of a problem has been diagnosed and rectified, the repair can be verified by retesting with the oscilloscope.
- The oscilloscope can also be used to check the overall condition of an engine management system equipped with a catalytic converter, by monitoring the activity of the oxygen sensor.
- The complex electronic engine management systems fitted to catalyst equipped vehicles are designed to maintain the mixture level between quite close tolerances so that the oxygen sensor is able react to small changes in the exhaust oxygen level and feed this information back to the ECM in the form of a voltage signal. By watching the oxygen sensor signal with an oscilloscope any irregularity in the overall system performance can be detected. If the wave form displayed is satisfactory this is a reliable indication that the whole system is operating correctly.
- Currently available oscilloscopes are easy to connect and use, enabling a trace to be displayed on the screen without any specialist knowledge or experience. The interpretation of this trace can be greatly assisted by reference to the typical wave forms illustrated in this chapter.

## Wave forms – Fig. 1

- Each oscilloscope wave form has one or more of the following parameters:
  - Amplitude – voltage (V)
    - The signal voltage at a certain moment in time
  - Frequency – cycles per second (Hz)
    - The time between points of the signal
  - Pulse width – duty cycle (%)
    - The period during which the signal is ON – expressed as a percentage (%) of the total
  - Shape – spike, curve, saw-tooth etc.
    - The overall 'picture' of the signal
  - Pattern – repeated shapes
    - The pattern of repetition of the overall shape of the signal
- The oscilloscope will show all these parameters in one display and by comparing the scope traces from the vehicle under test with those illustrated, a judgement can be made about the condition of each circuit and its components.
- The scope trace for a faulty circuit or component will usually appear very different to that for a satisfactory one, thus simplifying fault identification.
- The five parameters listed above can be categorised as follows:

Fig. 1

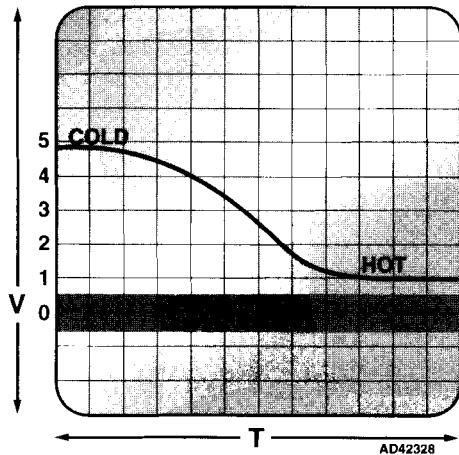


Wave form parameters

## Direct current (DC) voltage signals – amplitude only

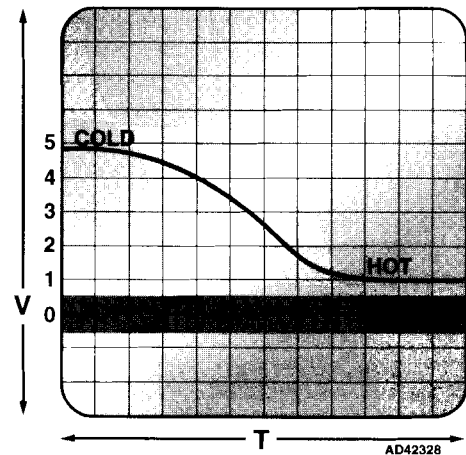
- Analogue signal voltages from components such as:

**Fig. 2**



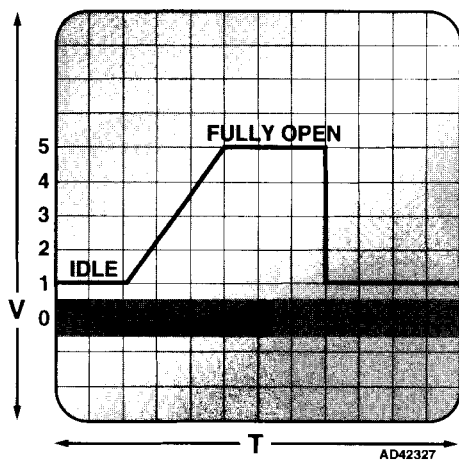
**Engine coolant temperature (ECT) sensor**

**Fig. 3**



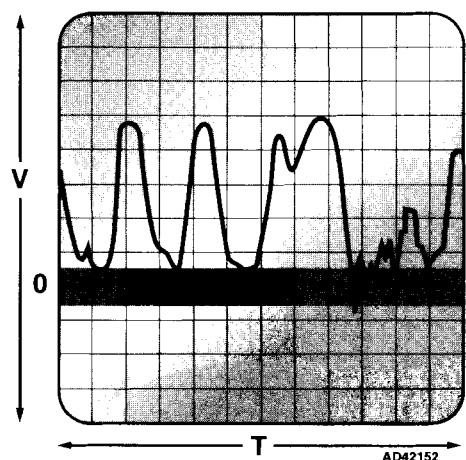
**Intake air temperature (IAT) sensor**

**Fig. 4**



**Throttle position (TP) sensor**

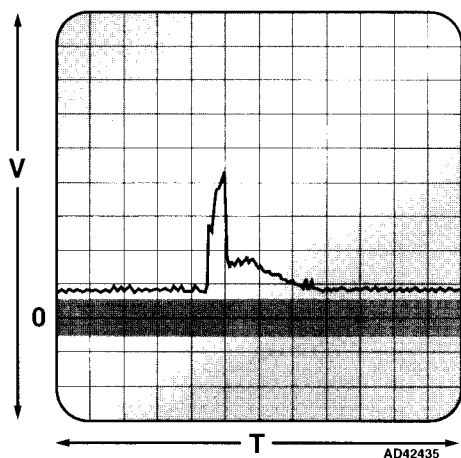
**Fig. 5**



**Heated oxygen sensor (HO2S)**

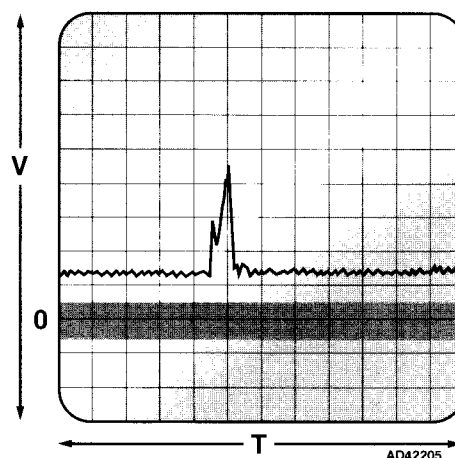
# Oscilloscope testing

Fig. 6



Volume air flow (VAF) sensor

Fig. 7

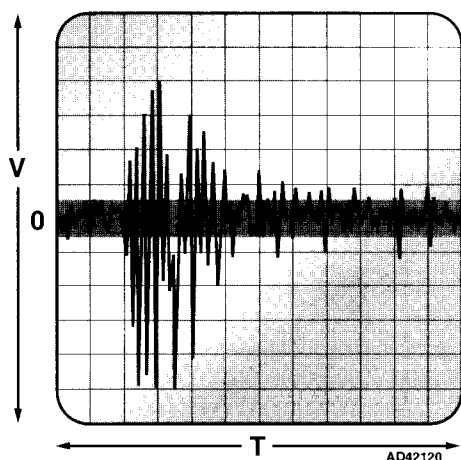


Mass air flow (MAF) sensor

## Alternating current (AC) voltage signals – amplitude, frequency and shape

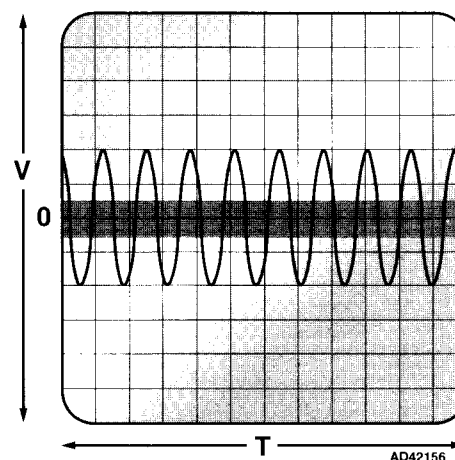
- AC voltage signals are generated by components such as:

Fig. 8



Knock sensor (KS)

Fig. 9

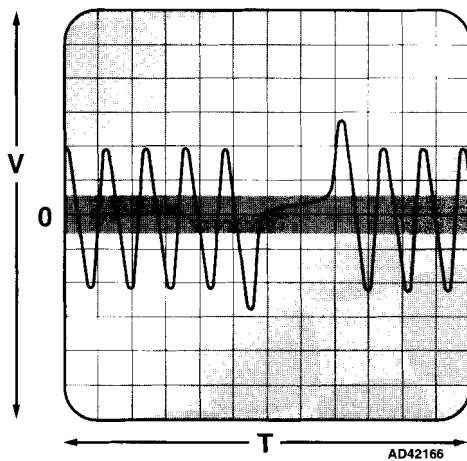


Engine speed (RPM) sensor – inductive type

## Frequency modulated signals – amplitude, frequency, shape and pulse width

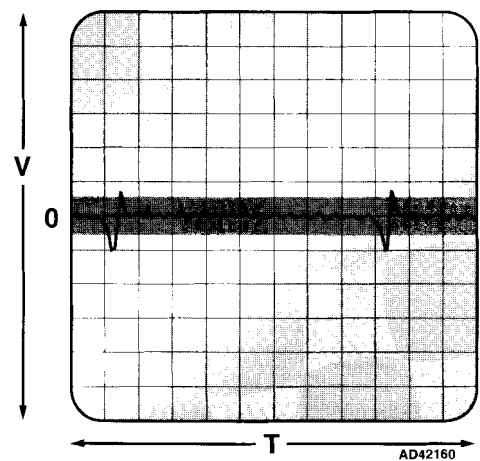
- Frequency modulated signals are generated by components such as:

**Fig. 10**



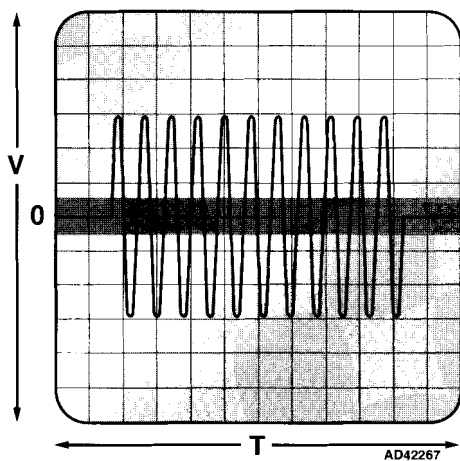
**Crankshaft position (CKP) sensor – inductive type**

**Fig. 11**



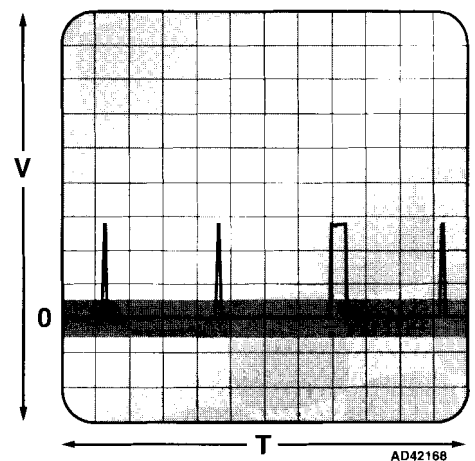
**Camshaft position (CMP) sensor – inductive type**

**Fig. 12**



**Vehicle speed (VSS) sensor – inductive type**

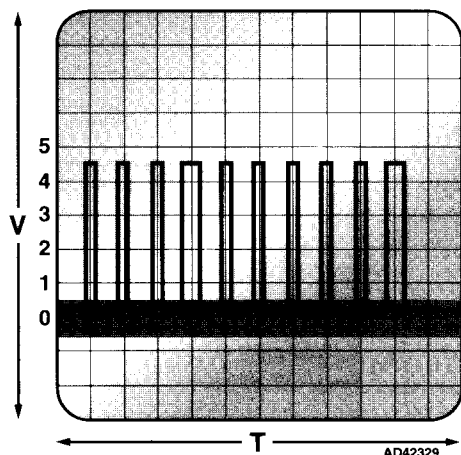
**Fig. 13**



**Hall effect speed and position sensors**

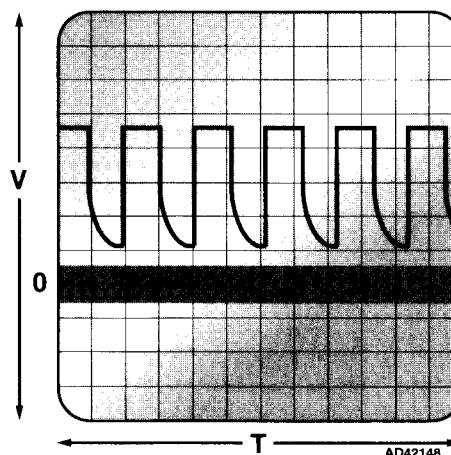
# Oscilloscope testing

Fig. 14



Optical speed and position sensors

Fig. 15

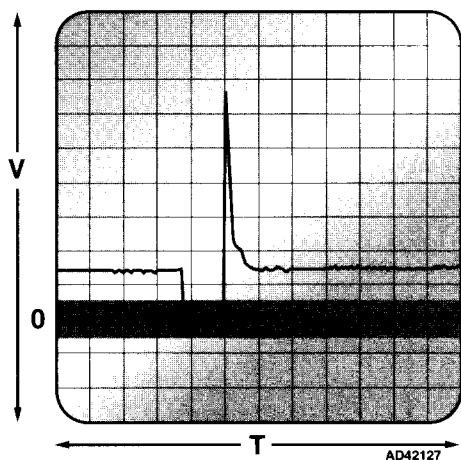


Mass air flow (MAF) and manifold absolute pressure (MAP) sensors – digital type

## Pulse width modulated signals – amplitude, frequency, shape, pulse width

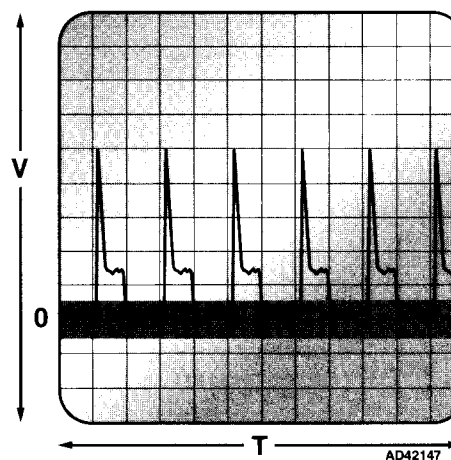
- Pulse width modulated signals from components such as:

Fig. 16



Injectors

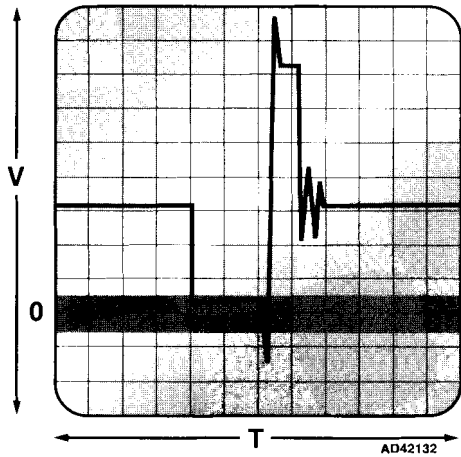
Fig. 17



Idle air control (IAC) devices

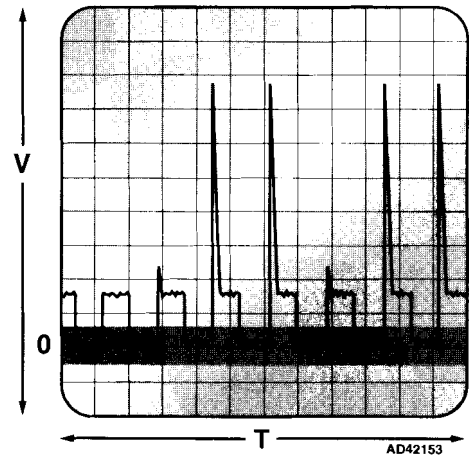


Fig. 18



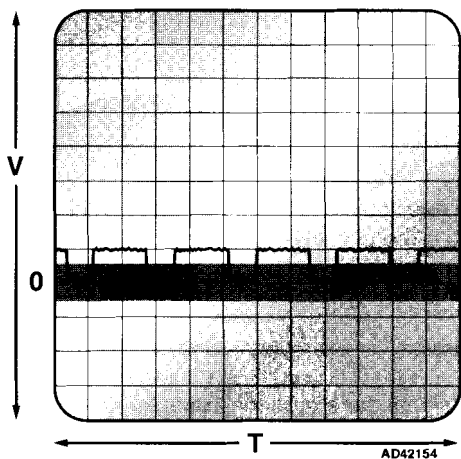
Ignition coil primary circuits

Fig. 19



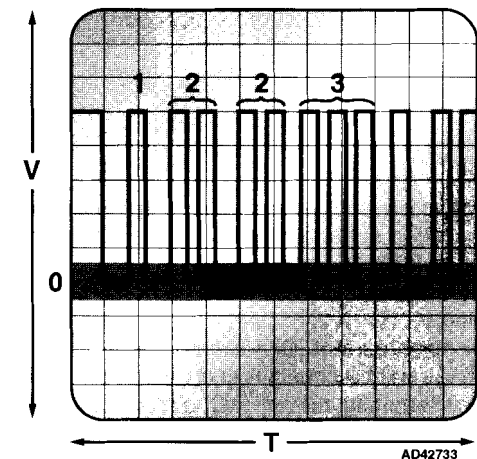
Evaporative emission (EVAP) canister purge valve

Fig. 20



Exhaust gas recirculation (EGR) valves

Fig. 21



Trouble code wave form

## Serial data – amplitude, frequency, shape, pulse width and pattern

- Serial data signals will be generated by the engine control module (ECM), if it has a self-diagnosis facility – Fig. 21.
- By noting the pulse width, pattern and frequency, the short pulses can be counted in groups and interpreted as a trouble code, in this case 1223.
- The amplitude and shape remain constant and the pattern will be repeated until the trouble code has been erased.

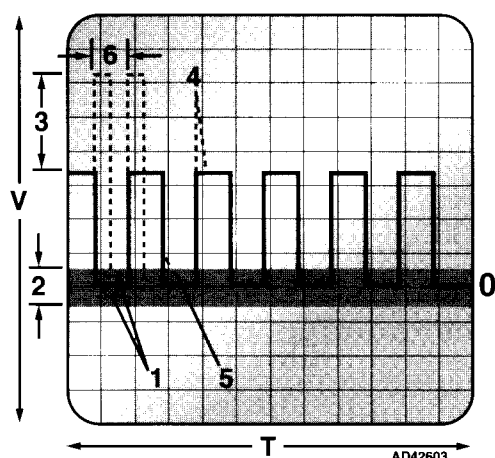
# Oscilloscope testing

## Interpreting wave forms

### Typical wave forms – Fig. 22 & Fig. 23

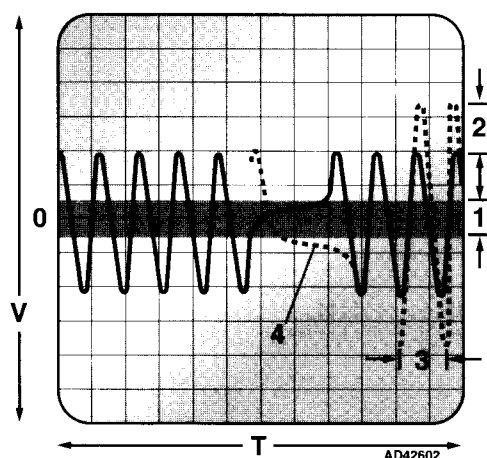
- Oscilloscope wave form patterns can vary greatly and are dependent on many factors. Therefore prior to making a diagnosis or changing components the following points should be considered when the wave form obtained does not appear to be correct when compared with the 'typical' wave form.

Fig. 22



Digital wave form

Fig. 23



Analogue wave form

### Voltage

- Typical wave forms indicate the approximate position of the wave form in relationship to the 'zero grid', but this may vary Fig. 22 [1], dependent on the system being tested and may be positioned anywhere within the approximate 'zero range' Fig. 22 [2] & Fig. 23 [1].
- The amplitude or overall height of the pattern (the voltage) Fig. 22 [3] & Fig. 23 [2], will depend on the circuit's operating voltage.
- For direct current (DC) circuits this will depend on the voltage being switched, for example, idle speed control device voltage will be constant and will not vary with engine speed.
- For alternating current (AC) circuits this will depend on the speed of the signal generator, for example, an inductive crankshaft position (CKP) sensor's output voltage will increase with engine speed.
- Therefore if the oscilloscope pattern is too high (or the upper part is missing) increase the voltage scale to obtain the view required. If the pattern is too low decrease the voltage scale.
- Some circuits operating solenoid components, for example idle speed control devices, may display voltage spikes Fig. 22 [4], when the circuit is switched off. This voltage is generated by the component and can normally be ignored.
- Some circuits that have a square wave type of typical wave form may display the voltage decaying at the end of the switching period Fig. 22 [5]. This is a characteristic of some systems and can normally be ignored, as it does not by itself indicate a fault.

### Frequency

- The overall width of the pattern (the frequency), will depend on the circuit's operating speed.
- The typical wave forms illustrated show the wave form viewed with the oscilloscope's time scale set to enable detailed observation.
- In direct current (DC) circuits the time scale will be dependant on the speed at which the circuit is switched Fig. 22 [6], for example, the frequency of an idle speed control device will vary with engine load.

- In alternating current (AC) circuits the time scale will depend on the speed of the signal generator **Fig. 23** [3], for example, an inductive crankshaft position (CKP) sensor's frequency will increase with engine speed.
- If the oscilloscope pattern is too compressed, decrease the time scale to obtain the view required. If the pattern is too expanded, increase the time scale.
- If the pattern is reversed **Fig. 23** [4], this indicates that the system being tested has its component connected in the opposite polarity to the typical wave form shown and can normally be ignored as it does not by itself indicate a fault.

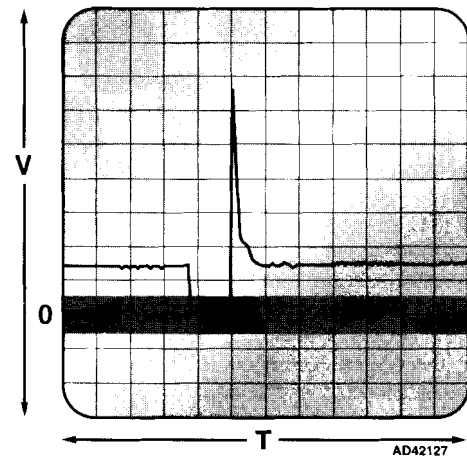
## Component testing

- Wave forms for a variety of components can be displayed. A few of the more common examples are described below.
- Most modern oscilloscopes have just two test leads, used with a variety of interchangeable test probes. The red lead is the positive and is normally connected to the ECM pin. The black lead is the negative and is normally connected to a good earth.
- If the leads are inadvertently connected with the wrong polarity, usually the only consequence is that the wave form will be displayed upside down.

## Injectors

- All electronically controlled intermittent injection systems operate by varying the opening time of the injectors to match the quantity of fuel supplied with the engine operating conditions.
- The duration of the electrical impulses from the control module is measured in milliseconds (ms) and typically ranges from 1 to 14. The oscilloscope on most engine testers can be used to display the injector pulse, enabling the duration to be measured.
- A typical oscilloscope trace is shown in **Fig. 24**.
- A series of smaller pulses, which hold the injector open after the initial negative pulse and a sharp positive voltage spike may be displayed as the injector closes.
- It is therefore possible to check that the control module is operating correctly by observing the changes in injector opening times during various engine operating conditions.
- Pulse duration during cranking and at idle speed will be higher than at low engine speeds, but will increase as the engine speed rises, up to a maximum at full throttle.
- This effect will be particularly evident if the throttle is 'blipped'.

**Fig. 24**



**Injector wave form**

## Injector pulse

- Using a thin probe, connect the oscilloscope test probe to the ECM injector terminal and the second test probe to earth.
- Crank the engine and check the wave form.
- Start engine and observe the wave form at idle speed.
- Open the throttle rapidly to increase engine speed to around 3000 rpm.
- The measured pulse duration should increase during acceleration and then stabilise at a reading equal to or slightly below the idle speed value.
- Close the throttle rapidly and the trace should become a straight line with no pulse indicating that injection has been cut-off (for systems fitted with overrun injection cut-off).
- When the engine is started from cold the quantity of fuel required is increased and therefore the pulse duration or dwell will be greater.
- During warm-up the injection period should progressively decrease until the engine reaches normal operating temperature.
- Systems without a cold start injector usually give additional injector pulses during the cold start, which may be seen as long and short pulses on the scope.

## Typical injector duration periods

CONDITION	DURATION
Idle speed	1,5-5 ms
2000-3000 rpm	1,1-3,5 ms
Full throttle	8,2-8,4 ms

# Oscilloscope testing

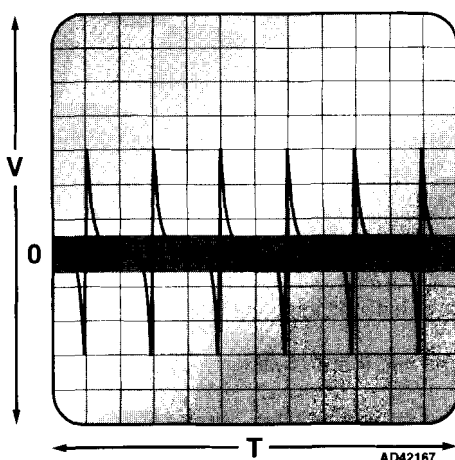
## Inductive sensors – Fig. 25

- The general procedure is as follows:
- Select sensor pin from pin data list with wave form reference.
- Connect oscilloscope probe to ECM pin and second probe to earth.
- Start engine and observe test conditions.
- Compare scope trace with wave form reference.
- Raise the engine speed and watch for the voltage (amplitude) display to increase.

## Idle air control (IAC) valve

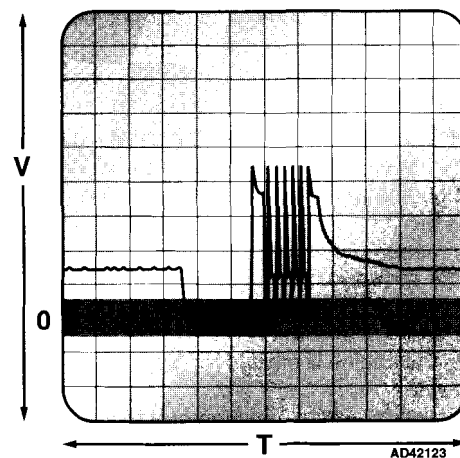
- Idle air control (IAC) valves come in many different types, each with a different wave form.
- In each case the duty cycle (or ON time) of the valve should increase when any additional engine load starts to reduce the idle speed.
- If the duty cycle varies but the idle speed is not maintained under load, this indicates a faulty valve.
- If the wave form shows a straight line around the zero mark, or the line is constant at the 5 V or 12 V level, this indicates a fault in the IAC valve circuit or ECM signal output.
- The commonly used 4 pin stepper motor type is described below. Two and three pin IAC valves can be tested in a similar way, but will of course generate very different wave forms.
- The stepper motor responds to an oscillating signal from the ECM, enabling small adjustments to be made to the engine idle speed, in reaction to variations of operating temperature and load.
- This voltage signal can be checked by connecting the oscilloscope test probe to each of the four stepper motor ECM pins in turn.
- Ensure engine is at normal operating temperature.
- Start the engine and allow idle speed to stabilise.
- Increase the load on the engine by switching on the headlights, air conditioning or by turning the steering (power steering only).
- The idle speed should momentarily drop, but then be stabilised by the action of the IAC valve.
- Compare scope trace with wave form reference **Fig. 26**.

**Fig. 25**



**Inductive sensor wave form**

**Fig. 26**



**Idle air control (IAC) valve wave form**

## Oxygen sensor (O2S)

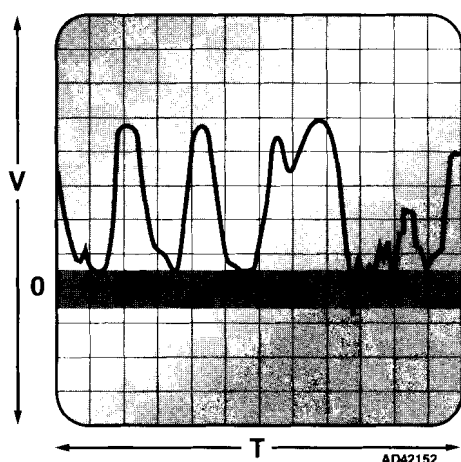
**NOTE:** The following voltage figures refer to the almost universally used Zirconium type O2S, without a 0,5 V control reference. A few recent models are fitted with a Titanium sensor which has an operating range of 0-5 volts and shows a high voltage signal with a weak mixture and a low voltage signal with a rich mixture.

- Connect oscilloscope test probes between oxygen sensor ECM pin and earth.
- Ensure engine is at normal operating temperature.
- Compare scope trace with wave form reference **Fig. 27**.
- If the trace shows no wave form but instead is a straight line, this usually indicates a weak mixture if the voltage is approximately 0-0,15, or a rich mixture if the voltage is approximately 0,6-1 – refer to Autodata fuel injection/engine management manuals or CD for possible causes of this condition.
- If the wave form is satisfactory at idle, open the throttle briefly several times in succession.
- The wave form should show the signal voltage 'cycling' between approximately 0-1 Volt.
- The increasing voltage corresponds to the engine speed rising and the decreasing voltage corresponds to the engine speed falling.

## Knock sensor (KS)

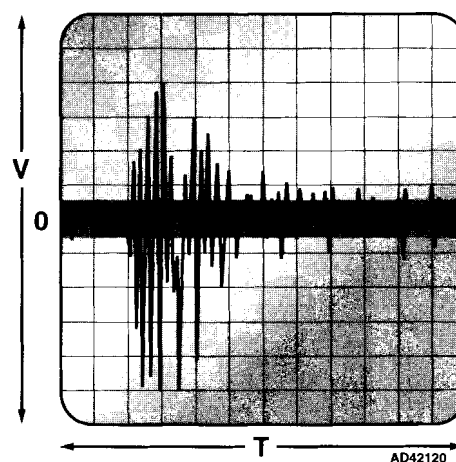
- Connect oscilloscope test probes between knock sensor ECM pin and earth.
- Ensure engine is at normal operating temperature.
- Briefly snap throttle open.
- Wave form should display an AC signal showing a considerable increase in amplitude **Fig. 28**.
- If this signal is not distinctly displayed, tap the cylinder block lightly in the region of the sensor.
- If the signal is still not satisfactory this indicates a faulty sensor or associated circuit.

**Fig. 27**



**Oxygen sensor (O2S) wave form**

**Fig. 28**



**Knock sensor (KS) wave form**

# Oscilloscope testing

## Ignition amplifier

- Connect oscilloscope test probes between ignition amplifier ECM pin and earth.
- Ensure engine is at normal operating temperature.
- Start the engine and allow to idle.
- The signal should show a digital DC voltage pulse.
- Compare scope trace with wave form reference **Fig. 29**.
- If the signal is satisfactory the amplitude, frequency and shape of each pulse should be closely matched.
- Increase the engine speed and check that the signal frequency increases in proportion to the engine rpm.

## Ignition coil – primary

- Connect oscilloscope test probes between ignition coil ECM pin and earth.
- Ensure engine is at normal operating temperature.
- Start the engine and allow to idle.
- Compare scope trace with wave form reference **Fig. 30**.
- Positive voltage spikes should be of even amplitude.
- Major differences of amplitude could indicate either a high resistance in the secondary circuit or a faulty spark plug or HT lead (where applicable).

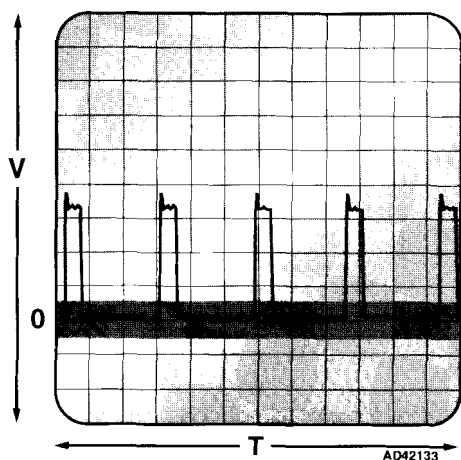
## Electronic control modules

- Without specialist equipment and data no testing of control modules is possible, except by self-diagnosis (if applicable) or substitution.
- Several companies operate a repair or exchange service for control modules and some offer a diagnosis service via a modem link to an appointed agent.
- However it is possible to check:
  - The signal inputs.
  - The signal outputs.
  - The wiring.

**NOTE:** Refer to Autodata Pin Data manual or CD2 for engine management system signal values.

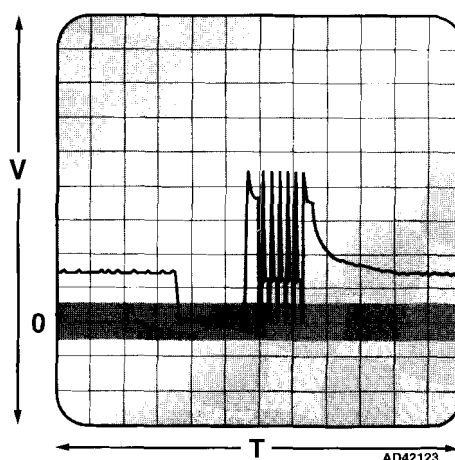
**NOTE:** For information regarding control module self-diagnosis refer to model-specific chapter in this manual.

**Fig. 29**



**Ignition amplifier wave form**

**Fig. 30**



**Ignition coil wave form**



# Trouble codes

## Introduction

All the systems covered by this manual are controlled by a module which incorporates a self-diagnosis function. These control modules are capable of detecting certain faulty signals and storing them for access later.

In many cases the detection of a faulty signal will cause the control module to invoke the limp-home mode, which adopts a mean signal value (programmed into the control module memory), to enable the vehicle to be driven until the fault can be diagnosed and rectified.

In many early models faults are signalled by numerical trouble codes comprising two, three or four digits, which can be interpreted by reference to the code tables in this manual. Later models have EOBD codes which are mandatory on new vehicles produced after January 2000.

Trouble codes on early models may be displayed by an LED on the control module, or on the fascia mounted malfunction indicator lamp (MIL). If this is not possible then an LED tester can sometimes be used at the data link connector (DLC). If access to trouble codes is possible in this manner it is described along with the relevant code table.

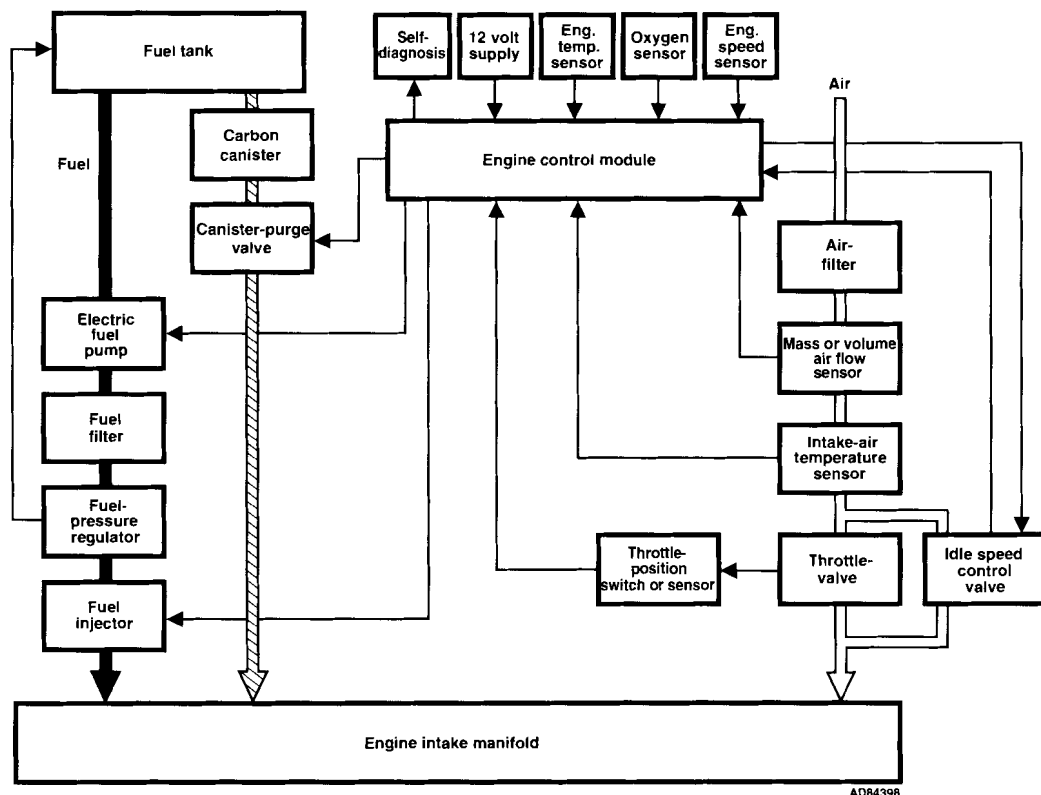
Many later models and those that comply with EOBD regulations may require a scan tool to enable the trouble code information to be displayed.

Self-diagnosis for fuel injection, mapped ignition and integrated engine management systems has been used for many years, but with the more recently introduced electronically controlled transmissions and immobilizer systems, the scope for trouble code based fault diagnosis has expanded considerably and the adoption of European On-Board Diagnostics (EOBD) has brought a degree of standardisation.

## Engine management

- The engine control module (ECM) processes the load and temperature signals received from the system sensors and controls the fuel/air ratio, idle speed, ignition timing and other functions through outputs to the actuators, such as injectors, idle speed control (ISC) valve, evaporative emission (EVAP) canister purge valve etc.
- As emission regulations have become more stringent, more systems, such as throttle control, cruise control, transmissions and immobilizers have been linked to the ECM.
- The ECM self-diagnosis fault memory will log trouble codes if certain inputs or outputs are outside the programmed parameters and may invoke 'limp home' substitute values for any out-of range signals, to enable the vehicle to continue to be driven until repairs can be carried out.

Fig. 1



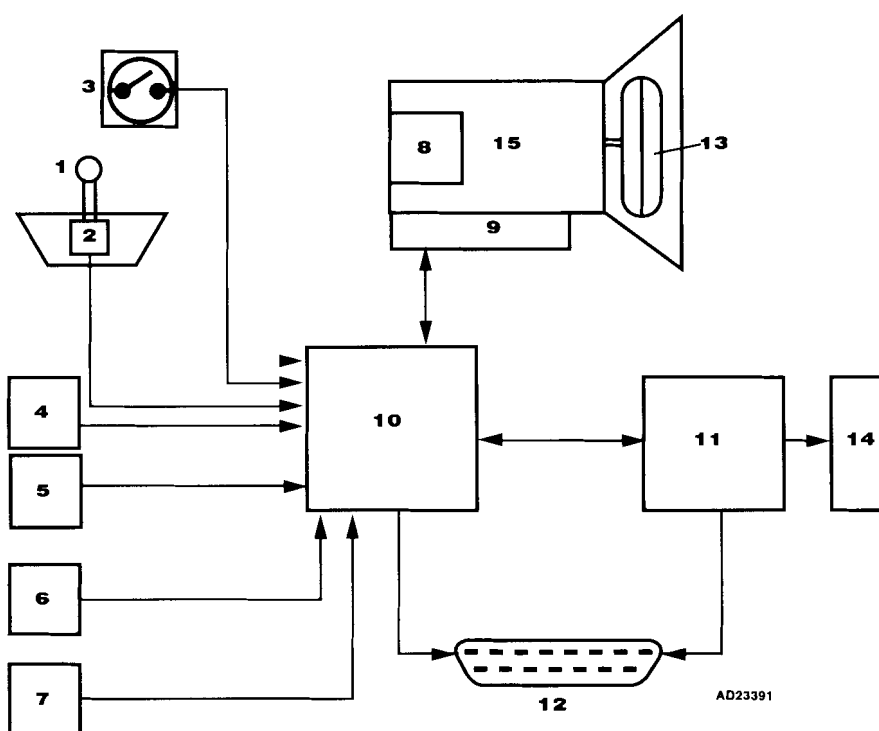
Typical engine management system

## Electronically controlled transmissions

- Most electronically controlled transmission systems have sensors monitoring load, selector lever position, gear change strategy program, transmission output shaft speed, engine crankshaft speed, and speed of brake and throttle operation. Signals from these are sent to a combined engine and transmission (powertrain) control module or a separate transmission control module (TCM).
- These inputs are processed by the transmission control module (TCM) and appropriate control outputs are sent to the transmission.
- Where a separate engine control module (ECM) and transmission control module (TCM) are used, these are linked and data is shared between the two.
- The self-diagnosis fault memory will log trouble codes when certain control module inputs or outputs are outside the programmed parameters and may invoke 'limp home' substitute values for any out-of range signals.
- There are several types of transmission that can have electronic control with self-diagnosis trouble code output:
  - Automatic
  - Semi-automatic
  - 4 wheel drive
- Automatic transmission: usually comprise a torque converter driven by the engine crankshaft and an epicyclic gearbox with four or five forward ratios.
- The mechanical operation of the transmission is actuated hydraulically, but with electronic controls, enabling several different change patterns to be selected by the driver (e.g. sport, economy etc.). Smoother gear changes (using torque reduction by retarding the ignition timing) and better matching of gear ratios to available torque, are also advantages.
- Lower powered (and often front-wheel drive) cars may be fitted with a continuously variable transmission. This may be driven via a torque converter, multi-plate clutch or magnetic coupling.
- In this form of transmission a steel band is driven by a variable diameter drum and the output is from a similarly variable diameter drum. It has no fixed ratios and finds its own 'ideal' ratio from the inputs of speed and load sensors.
- Semi-automatic transmission: these are a comparatively recent innovation and use a conventional gearbox (helical spur gears) with hydraulically operated clutch. Electronics are used to ensure smooth gear changes, prevent excessive engine speeds and to 'blip' the throttle during down changes.
- 4 wheel drive: vehicles with a Haldex coupling between the front and rear wheels have electronic control of the centre differential. Sensor inputs from the wheel speed sensors, stop lamp switch and other control modules (via a CAN data bus) are used to govern the power distribution between the front and rear wheels.
- The transmission systems covered by this manual have associated trouble codes which will be logged under certain fault conditions.
- These codes may be part of the engine management trouble code output (in the case of powertrain control modules) or they may be accessed separately – refer to model-specific chapters.

Fig. 2

- 1 Selector lever
- 2 Selector position switch
- 3 Mode selection switch
- 4 Kickdown switch
- 5 Throttle position (TP) sensor
- 6 Engine torque signal
- 7 Engine speed (RPM) signal
- 8 Output shaft speed (OSS) sensor
- 9 Solenoid valves
- 10 Transmission control module (TCM)
- 11 Engine control module (ECM)
- 12 Data link connector (DLC)
- 13 Torque converter
- 14 Ignition coils
- 15 Epicyclic gearbox



Typical electronically controlled automatic transmission components

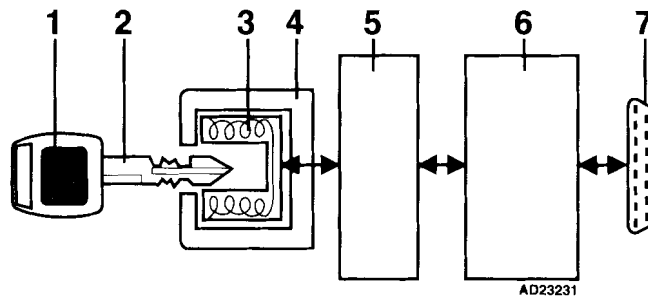


## Immobilizers

- The immobilizer may be self-contained or integrated with the alarm system and remote control central locking, all activated from the key. The central locking will be operated separately by either an infrared or radio frequency signal and requires a self-contained battery supply.
- The immobilizer may also be controlled by the infrared/radio frequency signal or separately by a transponder.
- The transponder [1] is embedded in the ignition key [2], and is activated by a read coil [3] in the ignition switch [4]. The read coil is connected to the immobilizer control module [5] which is linked to the engine control module (ECM) [6].
- The transponder uses induced power from the read solenoid and therefore does not require a battery supply.
- When the ignition is switched on, the read solenoid induces a response from the transponder, which then transmits its unique security code to the immobilizer control module.
- The key code is compared with the stored code in the immobilizer control module and then matched with the 'rolling' code in the ECM.
- If all the criteria match, the engine will run normally.
- If the immobilizer control module does not recognise the key code the engine will either not start or only run for a few seconds.
- The immobilizer is automatically reset when the key is withdrawn from the ignition switch.
- Many immobilizer systems feature fault memories which can be accessed in various ways e.g. by counting the immobilizer warning lamp flashes, bridging data link connector (DLC) terminals with a voltmeter or LED tester, or using suitable diagnostic equipment – refer to model-specific chapters.

**Fig. 3**

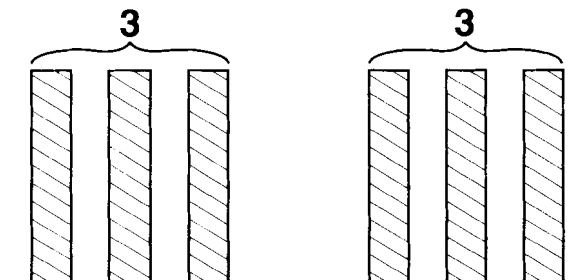
- 1 Transponder
- 2 Key
- 3 Read coil
- 4 Ignition switch
- 5 Immobilizer control module
- 6 Engine control module (ECM)
- 7 Data link connector (DLC)



## Trouble code format

- Prior to 2000 there was no uniformity in the display, format or method of retrieval of diagnostic trouble codes, each vehicle manufacturer developing a dedicated system with special diagnostic equipment and varying amounts of data logging. Some systems having just a few one or two digit codes while others had more comprehensive three and four digit coding systems.
- In many cases the codes for these early systems could be displayed by connecting an LED tester between the appropriate terminals of the data link connector (DLC) and counting the flashes or groups of flashes.
- For example **Fig. 4** shows a diagrammatic representation of three LED (or MIL) flashes. The vertical scale represents voltage and the horizontal scale represents time, therefore the shaded areas represent the 'on' time and the gaps in between represent the 'off' time.
- The three short flashes, with a short pause separating each flash, display trouble code 3. If more than one code has been logged, a long pause would be used to separate each code.

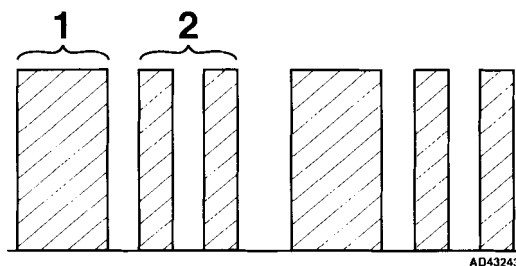
**Fig. 4**



# Trouble codes

- If the trouble code is greater than 9, long flashes are used for the tens and short flashes for the units. For example **Fig. 5** shows one long flash, and two short flashes separated by a short pause, indicating trouble code 12.
- In 1988 the California Air Resources Board (CARB) introduced legislation covering all new cars sold in California. These new laws governed on-board diagnostic requirements for emissions related faults and began the process of standardization in the US and eventually Europe.
- These regulations were known as onboard diagnostic systems - phase I (OBD-I) and were subsequently adopted by the vehicle manufacturers, for states other than California.
- The basic requirements of OBD-I were as follows:
  - A malfunction indicator lamp (MIL), to provide a visible warning that an emissions related fault had been logged by the engine control module (ECM).
  - Provision for the logging and storage, for subsequent retrieval, of diagnostic trouble codes (DTC)/flash codes for emissions related faults.
  - The location of the diagnostic socket, the method of access to the trouble codes and the configuration and scope of the self-diagnosis was left to individual vehicle manufacturers.
- This resulted in an almost complete lack of standardization, requiring the technician to adopt different procedures and to use different equipment for each vehicle.
- In 1995 the California Air Resources Board (CARB), after consultation with the Society of Automotive Engineers (SAE), introduced further legislation covering all new cars sold in California.
- These regulations are known as OBD-II and have been adopted for all states. They closely define trouble code logging and retrieval. More significantly they require monitoring of the operation of the system and components, in addition to detecting component failures.
- OBD-II also covers systems other than engine management.
- Basically the US OBD-II regulations have been adopted for European vehicles and are known as EOBD – European On Board Diagnostics.
- These EOBD regulations became mandatory for most new petrol engined vehicles produced after January 1st 2000 (diesel and LPG engined cars were not required to comply until 2003). Most petrol engined vehicles already in production before January 1st 2000 were granted exemption until January 1st 2001.

**Fig. 5**

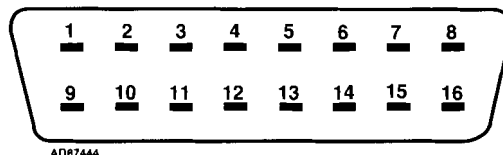


## EOBD codes

### Basic requirements

- Malfunction indicator lamp (MIL) located on the instrument panel, which either flashes or illuminates continuously, when a fault is detected. If no fault is present the MIL should illuminate when the ignition is switched on and extinguish when the engine starts.
- Standard configuration of 16 pin data link connector (DLC)
- The 16 pins of the DLC are arranged in two parallel rows, with certain pin connections defined by the EOBD regulations and the rest allocated by the vehicle manufacturer – **Fig. 6**

**Fig. 6**



### Standard location for the DLC

- The standard location for the DLC is defined as being between the driver's end of the instrument panel and 300 mm beyond the vehicle centre line, accessible from the driver's seat.
- The recommended location is between the steering column and the vehicle centre line.

## Format of EOBD codes

Standard, 5 element alpha-numeric format, trouble codes, made up as follows:

### Letter prefix defines system designation

<b>B</b>	Body
<b>C</b>	Chassis
<b>P</b>	Powertrain
<b>U</b>	Network communications systems

### First digit defines code type

<b>0</b>	Standard EOBD
<b>1</b>	Defined by vehicle manufacturer
<b>2</b>	Standard EOBD
<b>3</b>	Standard EOBD/defined by vehicle manufacturer

### Second digit defines system identification

<b>0</b>	Standard code (refer to P0 code list)
<b>1</b>	Fuel or air
<b>2</b>	Fuel or air
<b>3</b>	Ignition
<b>4</b>	Emission control
<b>5</b>	Speed control (idle, vehicle etc.)
<b>6</b>	Trip computer
<b>7</b>	Transmission
<b>8</b>	Transmission
<b>9</b>	Transmission

### Third and fourth digits define specific fault

These digits define general malfunction, range or performance of component or system, low or high input.

## Example code P0108

This code is logged when a high input is detected in the pressure circuit of the manifold absolute pressure (MAP) sensor or barometric pressure (BARO) sensor.

<b>P</b>	System – Powertrain
<b>0</b>	Code type – EOBD
<b>1</b>	System identification (fuel or air) – manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor
<b>0</b>	Pressure circuit
<b>8</b>	High input

**NOTE:** Emissions related problems have a ISO defined list of codes and definitions starting with P0001.



# Trouble codes

## Standard areas monitored:

### The following areas are monitored continuously:

- Misfire detection
- Fuel system performance
- Component performance

### The following areas are monitored once per 'trip'

**NOTE:** *The definition of a 'trip' varies, but is basically – key ON, vehicle driven, key OFF.*

- Catalytic converter
- Evaporative emission system
- Secondary air (AIR) system
- Air conditioning system
- Heated oxygen sensor (HO2S)
- Oxygen sensor (O2S) heater
- Exhaust gas recirculation (EGR) system
- In cases where flash codes and EOBD codes are listed for the same model range, only one flash code will be generated for a particular component, but there may be a list of many EOBD codes related to this component. Alternatively there may be some EOBD codes with no equivalent flash code(s).
- These EOBD codes will provide more specific details about the fault location, wiring, voltage signals and other information relative to the circuit or system.

### Logging faults with EOBD

- Fault logging is based on inputs received during each 'trip' which may comprise a number of 'drive cycles'.
- Each 'drive cycle' is initiated when the engine is started and is terminated when the engine is switched off.
- For a complete 'trip' to be completed the following, complex, conditions need to be met (and may take several 'drive cycles' to complete):
  - Before starting the engine, coolant temperature should be below 50°C and +/-6°C of ambient temperature.
    - This ensures that the ECM logs a cold start.
  - Allow engine to idle for 2-3 minutes with an electrical load switched on (such as headlamps or heated rear window).
    - This will ensure that the misfire monitoring and fuel trim monitoring programmes run.
  - Drive vehicle up to at least 50 mph and maintain this speed for at least 3 minutes.
    - Misfire and fuel trim monitoring will run.
  - Allow the speed to reduce to around 20 mph without changing gear, using the brakes or the clutch.
    - Fuel trim monitoring will run.
  - Accelerate to at least 50 mph and maintain for at least 5 minutes.
    - Misfire and fuel trim monitoring will run.
  - Allow the speed to reduce to around 20 mph without changing gear, using the brakes or the clutch.
    - Fuel trim monitoring will run.

- Each 'trip' starts when the engine is started and continues through a number of 'drive cycles' until all the EOBD monitors have completed a self-test.
- The EOBD monitoring programme provides operating tolerance checks on all emissions related sensors and actuators. Some components/circuits are continuously monitored and some are only activated under predetermined operating conditions.
- Misfire monitoring detects irregularities in the crankshaft position (CKP) sensor signal pattern and identifies which cylinder misfired and if the misfire is frequent enough to cause catalytic converter damage due to excess internal temperatures. If this is the case the MIL will flash.
- If the misfire is likely to increase emissions above the EOBD limits and occurs on each of two consecutive 'trips' the MIL will flash. If the misfire is absent during the next three 'trips' the MIL will be extinguished.
- When a fault code is logged a number of data parameters are stored with it, to assist in accurate fault diagnosis. These are:
  - Vehicle speed
  - Engine coolant temperature
  - Engine rpm
  - Engine load
  - Oxygen sensor system status – open/closed loop
  - Distance since fault first logged
  - Long term fuel trim (LTFT) level
- Most EOBD scan tools are capable of capturing this 'snapshot' of data and displaying (or printing) it for analysis to aid the fault diagnosis process.

### After rectification

- EOBD monitoring is very sensitive and replacement components may still be identified as faulty if their specifications do not exactly match the originals.
- The trouble code memory must be completely erased and a 'trip' completed.
- The trouble code memory should be accessed to establish that no further codes have been logged.



## EOBD trouble code table

- All EOBD codes starting with P zero have standard meanings irrespective of vehicle make or model.
- For EOBD codes, other than those starting P zero, refer to model-specific chapters.
- The following list covers all P0 codes allocated at the time of publication.

Trouble code	Fault location	Probable cause
P0000	No fault found	–
P0001	Fuel volume regulator control – circuit open	Wiring, regulator control solenoid
P0002	Fuel volume regulator control – circuit range/performance	Wiring, regulator control solenoid
P0003	Fuel volume regulator control – circuit low	Wiring short to earth, regulator control solenoid
P0004	Fuel volume regulator control – circuit high	Wiring open circuit/short to positive, regulator control solenoid
P0005	Fuel shut-off valve – circuit open	Wiring open circuit, fuel shut-off valve
P0006	Fuel shut-off valve – circuit low	Wiring short to earth, fuel shut-off valve
P0007	Fuel shut-off valve – circuit high	Wiring short to positive, fuel shut-off valve
P0008	Engine position system, bank 1 – engine performance	Mechanical fault
P0009	Engine position system, bank 2 – engine performance	Mechanical fault
P0010	Camshaft position (CMP) actuator, intake/left/front, bank 1 – circuit malfunction	Wiring, CMP actuator, ECM
P0011	Camshaft position (CMP), intake/left/front, bank 1 – timing over-advanced/system performance	Valve timing, engine mechanical fault, CMP actuator
P0012	Camshaft position (CMP), intake/left/front, bank 1 – timing over-retarded	Valve timing, engine mechanical fault, CMP actuator
P0013	Camshaft position (CMP) actuator, intake/left/front, bank 1 – circuit malfunction	Wiring, CMP actuator, ECM
P0014	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 – timing over-advanced/system performance	Valve timing, engine mechanical fault, CMP actuator
P0015	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 – timing over-retarded	Valve timing, engine mechanical fault, CMP actuator
P0016	Crankshaft position/camshaft position, bank 1 sensor A – correlation	Wiring, CKP sensor, CMP sensor, mechanical fault
P0017	Crankshaft position/camshaft position, bank 1 sensor B – correlation	Wiring, CKP sensor, CMP sensor, mechanical fault
P0018	Crankshaft position/camshaft position, bank 2 sensor A – correlation	Wiring, CKP sensor, CMP sensor, mechanical fault
P0019	Crankshaft position/camshaft position, bank 2 sensor B – correlation	Wiring, CKP sensor, CMP sensor, mechanical fault
P0020	Camshaft position (CMP) actuator, intake/left/front, bank 2 – circuit malfunction	Wiring, CMP actuator, ECM
P0021	Camshaft position (CMP), intake/left/front, bank 2 – timing over-advanced/system performance	Valve timing, engine mechanical fault, CMP actuator
P0022	Camshaft position (CMP), intake/left/front, bank 2 – timing over-retarded	Valve timing, engine mechanical fault, CMP actuator
P0023	Camshaft position (CMP) actuator, exhaust/right/rear, bank 2 – circuit malfunction	Wiring, CMP actuator, ECM
P0024	Camshaft position (CMP), exhaust/right/rear, bank 2 – timing over-advanced/system performance	Valve timing, engine mechanical fault, CMP actuator
P0025	Camshaft position (CMP), exhaust/right/rear, bank 2 – timing over-retarded	Valve timing, engine mechanical fault, CMP actuator
P0026	Intake valve control solenoid circuit, bank 1 – range/performance	Wiring, intake valve control solenoid
P0027	Exhaust valve control solenoid circuit, bank 1 – range/performance	Wiring, exhaust valve control solenoid

## EOBD trouble code table

Trouble code	Fault location	Probable cause
P0028	Intake valve control solenoid circuit, bank 2 – range/performance	Wiring, intake valve control solenoid
P0029	Exhaust valve control solenoid circuit, bank 2 – range/performance	Wiring, exhaust valve control solenoid
P0030	Heated oxygen sensor (HO2S) 1, bank 1, heater control – circuit malfunction	Wiring, HO2S, ECM
P0031	Heated oxygen sensor (HO2S) 1, bank 1, heater control – circuit low	Wiring short to earth, HO2S, ECM
P0032	Heated oxygen sensor (HO2S) 1, bank 1, heater control – circuit high	Wiring short to positive, HO2S, ECM
P0033	Turbocharger (TC) wastegate regulating valve – circuit malfunction	Wiring, TC wastegate regulating valve, ECM
P0034	Turbocharger (TC) wastegate regulating valve – circuit low	Wiring short to earth, TC wastegate regulating valve, ECM
P0035	Turbocharger (TC) wastegate regulating valve – circuit high	Wiring short to positive, TC wastegate regulating valve, ECM
P0036	Heated oxygen sensor (HO2S) 2, bank 1, heater control – circuit malfunction	Wiring, HO2S, ECM
P0037	Heated oxygen sensor (HO2S) 2, bank 1, heater control – circuit low	Wiring short to earth, HO2S, ECM
P0038	Heated oxygen sensor (HO2S) 2, bank 1, heater control – circuit high	Wiring short to positive, HO2S, ECM
P0039	Turbo/super charger bypass valve, control circuit – range/performance	Wiring, bypass valve
P0040	Oxygen sensor signals swapped, bank 1 sensor 1/bank 2 sensor 1	Wiring
P0041	Oxygen sensor signals swapped, bank 1 sensor 2/bank 2 sensor 2	Wiring
P0042	Heated oxygen sensor (HO2S) 3, bank 1, heater control – circuit malfunction	Wiring, HO2S, ECM
P0043	Heated oxygen sensor (HO2S) 3, bank 1, heater control – circuit low	Wiring short to earth, HO2S, ECM
P0044	Heated oxygen sensor (HO2S) 3, bank 1, heater control – circuit high	Wiring short to positive, HO2S, ECM
P0045	Turbo/super charger boost control solenoid – circuit open	Wiring, boost control solenoid
P0046	Turbo/super charger boost control solenoid – circuit range/performance	Wiring, boost control solenoid, mechanical fault
P0047	Turbo/super charger boost control solenoid – circuit low	Wiring short to earth, boost control solenoid
P0048	Turbo/super charger boost control solenoid – circuit high	Wiring short to positive, boost control solenoid
P0049	Turbo/super charger turbine – over-speed	Mechanical fault
P0050	Heated oxygen sensor (HO2S) 1, bank 2, heater control – circuit malfunction	Wiring, HO2S, ECM
P0051	Heated oxygen sensor (HO2S) 1, bank 2, heater control – circuit low	Wiring short to earth, HO2S, ECM
P0052	Heated oxygen sensor (HO2S) 1, bank 2, heater control – circuit high	Wiring short to positive, HO2S, ECM
P0053	Heated oxygen sensor (HO2S), bank 1, sensor 1 – heater resistance	Wiring, HO2S
P0054	Heated oxygen sensor (HO2S), bank 1, sensor 2 – heater resistance	Wiring, HO2S
P0055	Heated oxygen sensor (HO2S), bank 1, sensor 3 – heater resistance	Wiring, HO2S
P0056	Heated oxygen sensor (HO2S) 2, bank 2, heater control – circuit malfunction	Wiring, HO2S, ECM

## EOBD trouble code table

<b>Trouble code</b>	<b>Fault location</b>	<b>Probable cause</b>
P0057	Heated oxygen sensor (HO2S) 2, bank 2, heater control – heater circuit low	Wiring short to earth, HO2S, ECM
P0058	Heated oxygen sensor (HO2S) 2, bank 2, heater control – circuit high	Wiring short to positive, HO2S, ECM
P0059	Heated oxygen sensor (HO2S), bank 2, sensor 1 – heater resistance	Wiring, HO2S
P0060	Heated oxygen sensor (HO2S), bank 2, sensor 2 – heater resistance	Wiring, HO2S
P0061	Heated oxygen sensor (HO2S), bank 2, sensor 3 – heater resistance	Wiring, HO2S
P0062	Heated oxygen sensor (HO2S) 3, bank 2, heater control – circuit malfunction	Wiring, HO2S, ECM
P0063	Heated oxygen sensor (HO2S) 3, bank 2, heater control – circuit low	Wiring short to earth, HO2S, ECM
P0064	Heated oxygen sensor (HO2S) 3, bank 2, heater control – circuit high	Wiring short to positive, HO2S, ECM
P0065	Air assisted injector – range/performance problem	Air assisted injector
P0066	Air assisted injector – circuit malfunction/circuit low	Wiring short to earth, air assisted injector, ECM
P0067	Air assisted injector – circuit high	Wiring short to positive, air assisted injector, ECM
P0068	Manifold absolute pressure (MAP) sensor/mass air flow (MAF) sensor/throttle position correlation	Wiring, MAP sensor, MAF sensor, mechanical fault
P0069	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor correlation	MAP sensor, mechanical fault
P0070	Outside air temperature sensor – circuit malfunction	Wiring, outside air temperature sensor, ECM
P0071	Outside air temperature sensor – range/performance problem	Outside air temperature sensor
P0072	Outside air temperature sensor – low input	Wiring short to earth, outside air temperature sensor, ECM
P0073	Outside air temperature sensor – high input	Wiring short to positive, outside air temperature sensor, ECM
P0074	Outside air temperature sensor – circuit intermittent	Wiring, poor connection, outside air temperature sensor, ECM
P0075	Intake valve control solenoid, bank 1 – circuit malfunction	Wiring, intake valve control solenoid, ECM
P0076	Intake valve control solenoid, bank 1 – circuit low	Wiring short to earth, intake valve control solenoid, ECM
P0077	Intake valve control solenoid, bank 1 – circuit high	Wiring short to positive, intake valve control solenoid, ECM
P0078	Exhaust valve control solenoid, bank 1 – circuit malfunction	Wiring, exhaust valve control solenoid, ECM
P0079	Exhaust valve control solenoid, bank 1 – circuit low	Wiring short to earth, exhaust valve control solenoid, ECM
P0080	Exhaust valve control solenoid, bank 1 – circuit high	Wiring short to positive, exhaust valve control solenoid, ECM
P0081	Intake valve control solenoid, bank 2 – circuit malfunction	Wiring, intake valve control solenoid, ECM
P0082	Intake valve control solenoid, bank 2 – circuit low	Wiring short to earth, intake valve control solenoid, ECM
P0083	Intake valve control solenoid, bank 2 – circuit high	Wiring short to positive, intake valve control solenoid, ECM
P0084	Exhaust valve control solenoid, bank 2 – circuit malfunction	Wiring, exhaust valve control solenoid, ECM
P0085	Exhaust valve control solenoid, bank 2 – circuit low	Wiring short to earth, exhaust valve control solenoid, ECM
P0086	Exhaust valve control solenoid, bank 2 – circuit high	Wiring short to positive, exhaust valve control solenoid, ECM



## EOBD trouble code table

Trouble code	Fault location	Probable cause
P0087	Fuel rail/system pressure too low	Fuel pump, fuel pressure regulator, fuel supply pipe blockage, mechanical fault
P0088	Fuel rail/system pressure too high	Fuel pump, fuel pressure regulator, fuel return pipe blockage, mechanical fault
P0089	Fuel pressure regulator – performance problem	Fuel pressure regulator, mechanical fault
P0090	Fuel metering solenoid – open circuit	Wiring open circuit, fuel metering solenoid, ECM
P0091	Fuel metering solenoid – short to earth	Wiring short to earth, fuel metering solenoid, ECM
P0092	Fuel metering solenoid – short to positive	Wiring short to positive, fuel metering solenoid, ECM
P0093	Fuel system leak – large leak detected	Wiring, fuel pressure sensor, mechanical fault
P0094	Fuel system leak – small leak detected	Wiring, fuel pressure sensor, mechanical fault
P0095	Intake air temperature (IAT) sensor 2 – circuit malfunction	Wiring, poor connection, IAT sensor, ECM
P0096	Intake air temperature (IAT) sensor 2 – circuit range/performance	Wiring, poor connection, IAT sensor, ECM
P0097	Intake air temperature (IAT) sensor 2 – circuit low input	Wiring short to earth, IAT sensor, ECM
P0098	Intake air temperature (IAT) sensor 2 – circuit high input	Wiring short to positive, IAT sensor, ECM
P0099	Intake air temperature (IAT) sensor 2 – circuit intermittent/erratic	Wiring, poor connection, IAT sensor, ECM
P0100	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – circuit malfunction	Wiring, MAF/VAF sensor, ECM
P0101	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – range/performance problem	Intake leak/blockage, MAF/VAF sensor
P0102	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – low input	Wiring short to earth, MAF/VAF sensor, ECM
P0103	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – high input	Wiring short to positive, MAF/VAF sensor, ECM
P0104	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – circuit intermittent	Wiring, poor connection, MAF/VAF sensor, ECM
P0105	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor – circuit malfunction	Wiring, MAP sensor, BARO sensor, ECM
P0106	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor – range/performance problem	Intake/exhaust leak, wiring, MAP sensor, BARO sensor
P0107	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor – low input	Wiring short to earth, MAP sensor, BARO sensor, ECM
P0108	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor – high input	Wiring short to positive, MAP sensor, BARO sensor, ECM
P0109	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor – circuit intermittent	Wiring, poor connection, MAP sensor, BARO sensor, ECM
P0110	Intake air temperature (IAT) sensor – circuit malfunction	Wiring, IAT sensor, ECM
P0111	Intake air temperature (IAT) sensor – range/performance problem	IAT sensor
P0112	Intake air temperature (IAT) sensor – low input	Wiring short to earth, IAT sensor, ECM
P0113	Intake air temperature (IAT) sensor – high input	Wiring open circuit/short to positive, earth wire defective, IAT sensor, ECM
P0114	Intake air temperature (IAT) sensor – circuit intermittent	Wiring, poor connection, IAT sensor, ECM
P0115	Engine coolant temperature (ECT) sensor – circuit malfunction	Wiring, ECT sensor, ECM
P0116	Engine coolant temperature (ECT) sensor – range/performance problem	Coolant thermostat, poor connection, wiring, ECT sensor
P0117	Engine coolant temperature (ECT) sensor – low input	Coolant thermostat, wiring short to earth, ECT sensor
P0118	Engine coolant temperature (ECT) sensor – high input	Coolant thermostat, wiring open circuit/short to positive, earth wire defective, ECT sensor



## EOBD trouble code table

Trouble code	Fault location	Probable cause
P0119	Engine coolant temperature (ECT) sensor – circuit intermittent	Wiring, poor connection, ECT sensor, ECM
P0120	Throttle position (TP) sensor A/accelerator pedal position (APP) sensor A – circuit malfunction	Wiring, TP/APP sensor, ECM
	Throttle position (TP) switch A/accelerator pedal position (APP) switch A – circuit malfunction	Wiring, TP/APP switch, ECM
P0121	Throttle position (TP) sensor A/accelerator pedal position (APP) sensor A – range/performance problem	Accelerator cable adjustment, TP/APP sensor
	Throttle position (TP) switch A/accelerator pedal position (APP) switch A – range/performance problem	Accelerator cable adjustment, TP/APP switch
P0122	Throttle position (TP) sensor A/accelerator pedal position (APP) sensor A – low input	Wiring short to earth, TP/APP sensor, ECM
	Throttle position (TP) switch A/accelerator pedal position (APP) switch A – low input	Wiring short to earth, TP/APP switch, ECM
P0123	Throttle position (TP) sensor A/accelerator pedal position (APP) sensor A – high input	Wiring short to positive, TP/APP sensor, ECM
	Throttle position (TP) switch A/accelerator pedal position (APP) switch A – high input	Wiring short to positive, TP/APP switch, ECM
P0124	Throttle position (TP) sensor A/accelerator pedal position (APP) sensor A – circuit intermittent	Wiring, poor connection, TP/APP sensor, ECM
	Throttle position (TP) switch A/accelerator pedal position (APP) switch A – circuit intermittent	Wiring, poor connection, TP/APP switch, ECM
P0125	Insufficient coolant temperature for closed loop fuel control	Wiring, cooling system, coolant thermostat, ECT sensor
P0126	Insufficient coolant temperature for stable operation	Wiring, cooling system, coolant thermostat, ECT sensor
P0127	Intake air temperature too high	Wiring short to earth, IAT sensor 2, mechanical fault, ECM
P0128	Coolant thermostat – coolant temperature below thermostat regulating temperature	Mechanical fault
P0129	Barometric pressure too low	Wiring, BARO sensor, mechanical fault
P0130	Heated oxygen sensor (HO2S) 1, bank 1 – circuit malfunction	Heating inoperative, poor connection, wiring, HO2S
	Oxygen sensor (O2S) 1, bank 1 – circuit malfunction	Wiring, O2S, ECM
P0131	Heated oxygen sensor (HO2S) 1, bank 1 – low voltage	Exhaust leak, wiring short to earth, HO2S, ECM
	Oxygen sensor (O2S) 1, bank 1 – low voltage	Exhaust leak, wiring short to earth, O2S, ECM
P0132	Heated oxygen sensor (HO2S) 1, bank 1 – high voltage	Wiring short to positive, HO2S, ECM
	Oxygen sensor (O2S) 1, bank 1 – high voltage	Wiring short to positive, O2S, ECM
P0133	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Heating inoperative, wiring, HO2S
	Oxygen sensor (O2S) 1, bank 1 – slow response	Wiring, O2S
P0134	Heated oxygen sensor (HO2S) 1, bank 1 – no activity detected	Wiring open circuit, heating inoperative, HO2S
	Oxygen sensor (O2S) 1, bank 1 – no activity detected	Wiring, O2S
P0135	Heated oxygen sensor (HO2S) 1, bank 1, heater control – circuit malfunction	Fuse, wiring, HO2S, ECM
P0136	Heated oxygen sensor (HO2S) 2, bank 1 – circuit malfunction	Heating inoperative, wiring, HO2S, ECM
	Oxygen sensor (O2S) 2, bank 1 – circuit malfunction	Wiring, O2S, ECM
P0137	Heated oxygen sensor (HO2S) 2, bank 1 – low voltage	Exhaust leak, wiring short to earth, HO2S, ECM
	Oxygen sensor (O2S) 2, bank 1 – low voltage	Exhaust leak, wiring short to earth, O2S, ECM
P0138	Heated oxygen sensor (HO2S) 2, bank 1 – high voltage	Wiring short to positive, HO2S, ECM
	Oxygen sensor (O2S) 2, bank 1 – high voltage	Wiring short to positive, O2S, ECM

## EOBD trouble code table

Trouble code	Fault location	Probable cause
P0139	Heated oxygen sensor (HO2S) 2, bank 1 – slow response	Heating inoperative, wiring, HO2S
	Oxygen sensor (O2S) 2, bank 1 – slow response	Wiring, O2S
P0140	Heated oxygen sensor (HO2S) 2, bank 1 – no activity detected	Wiring, heating inoperative, HO2S, ECM
	Oxygen sensor (O2S) 2, bank 1 – no activity detected	Wiring, O2S, ECM
P0141	Heated oxygen sensor (HO2S) 2, bank 1, heater control – circuit malfunction	Wiring, HO2S, ECM
P0142	Heated oxygen sensor (HO2S) 3, bank 1 – circuit malfunction	Wiring, HO2S, ECM
P0143	Heated oxygen sensor (HO2S) 3, bank 1 – low voltage	Exhaust leak, wiring short to earth, HO2S, ECM
	Oxygen sensor (O2S) 3, bank 1 – low voltage	Exhaust leak, wiring short to earth, O2S, ECM
P0144	Heated oxygen sensor (HO2S) 3, bank 1 – high voltage	Wiring short to positive, HO2S, ECM
	Oxygen sensor (O2S) 3, bank 1 – high voltage	Wiring short to positive, O2S, ECM
P0145	Heated oxygen sensor (HO2S) 3, bank 1 – slow response	Heating inoperative, wiring, HO2S
	Oxygen sensor (O2S) 3, bank 1 – slow response	Wiring, O2S
P0146	Heated oxygen sensor (HO2S) 3, bank 1 – no activity detected	Wiring, HO2S, ECM
	Oxygen sensor (O2S) 3, bank 1 – no activity detected	Wiring, O2S, ECM
P0147	Heated oxygen sensor (HO2S) 3, bank 1, heater control – circuit malfunction	Wiring, HO2S, ECM
P0148	Fuel delivery error	Fuel pump/fuel injection pump
P0149	Fuel timing error	Fuel pump/fuel injection pump
P0150	Heated oxygen sensor (HO2S) 1, bank 2 – circuit malfunction	Wiring, HO2S, ECM
	Oxygen sensor (O2S) 1, bank 2 – circuit malfunction	Wiring, O2S, ECM
P0151	Heated oxygen sensor (HO2S) 1, bank 2 – low voltage	Exhaust leak, wiring short to earth, HO2S, ECM
	Oxygen sensor (O2S) 1, bank 2 – low voltage	Exhaust leak, wiring short to earth, O2S, ECM
P0152	Heated oxygen sensor (HO2S) 1, bank 2 – high voltage	Wiring short to positive, HO2S, ECM
	Oxygen sensor (O2S) 1, bank 2 – high voltage	Wiring short to positive, O2S, ECM
P0153	Heated oxygen sensor (HO2S) 1, bank 2 – slow response	Heating inoperative, wiring, HO2S
	Oxygen sensor (O2S) 1, bank 2 – slow response	Wiring, O2S
P0154	Heated oxygen sensor (HO2S) 1, bank 2 – no activity detected	Wiring, HO2S, ECM
	Oxygen sensor (O2S) 1, bank 2 – no activity detected	Wiring, O2S, ECM
P0155	Heated oxygen sensor (HO2S) 1, bank 2, heater control – circuit malfunction	Wiring, HO2S, ECM
P0156	Heated oxygen sensor (HO2S) 2, bank 2 – circuit malfunction	Heating inoperative, wiring, HO2S, ECM
	Oxygen sensor (O2S) 2, bank 2 – circuit malfunction	Wiring, O2S, ECM
P0157	Heated oxygen sensor (HO2S) 2, bank 2 – low voltage	Exhaust leak, wiring short to earth, HO2S, ECM
	Oxygen sensor (O2S) 2, bank 2 – low voltage	Exhaust leak, wiring short to earth, O2S, ECM
P0158	Heated oxygen sensor (HO2S) 2, bank 2 – high voltage	Wiring short to positive, HO2S, ECM
	Oxygen sensor (O2S) 2, bank 2 – high voltage	Wiring short to positive, O2S, ECM
P0159	Heated oxygen sensor (HO2S) 2, bank 2 – slow response	Heating inoperative, wiring, HO2S
	Oxygen sensor (O2S) 2, bank 2 – slow response	Wiring, O2S
P0160	Heated oxygen sensor (HO2S) 2, bank 2 – no activity detected	Wiring, HO2S, ECM
	Oxygen sensor (O2S) 2, bank 2 – no activity detected	Wiring, O2S, ECM

## EOBD trouble code table

<b>Trouble code</b>	<b>Fault location</b>	<b>Probable cause</b>
P0161	Heated oxygen sensor (HO2S) 2, bank 2, heater control – circuit malfunction	Wiring, HO2S, ECM
P0162	Heated oxygen sensor (HO2S) 3, bank 2 – circuit malfunction	Wiring, HO2S, ECM
	Oxygen sensor (O2S) 3, bank 2 – circuit malfunction	Wiring, O2S, ECM
P0163	Heated oxygen sensor (HO2S) 3, bank 2 – low voltage	Exhaust leak, wiring short to earth, HO2S, ECM
	Oxygen sensor (O2S) 3, bank 2 – low voltage	Exhaust leak, wiring short to earth, O2S, ECM
P0164	Heated oxygen sensor (HO2S) 3, bank 2 – high voltage	Wiring short to positive, HO2S, ECM
	Oxygen sensor (O2S) 3, bank 2 – high voltage	Wiring short to positive, O2S, ECM
P0165	Heated oxygen sensor (HO2S) 3, bank 2 – slow response	Heating inoperative, wiring, HO2S
	Oxygen sensor (O2S) 3, bank 2 – slow response	Wiring, O2S
P0166	Heated oxygen sensor (HO2S) 3, bank 2 – no activity detected	Wiring, HO2S, ECM
	Oxygen sensor (O2S) 3, bank 2 – no activity detected	Wiring, O2S, ECM
P0167	Heated oxygen sensor (HO2S) 3, bank 2, heater control – circuit malfunction	Wiring, HO2S, ECM
P0168	Fuel temperature too high	Wiring, fuel temperature sensor, mechanical fault
P0169	Incorrect fuel composition	Wiring, fuel composition sensor, mechanical fault
P0170	Fuel trim (FT), bank 1 – malfunction	Intake leak, AIR system, fuel pressure/pump, injector(s), EVAP canister purge valve, HO2S
P0171	System too lean, bank 1	Intake/exhaust leak, AIR system, MAF/VAF sensor, fuel pressure/pump, injector(s), HO2S
P0172	System too rich, bank 1	Intake blocked, EVAP canister purge valve, fuel pressure, EGR system, injector(s), HO2S
P0173	Fuel trim (FT), bank 2 – malfunction	Intake leak, AIR system, fuel pressure/pump, injector(s), EVAP canister purge valve, HO2S
P0174	System too lean, bank 2	Intake/exhaust leak, fuel pressure/pump, injector(s), AIR system, hose connection(s)
P0175	System too rich, bank 2	Intake blocked, EVAP canister purge valve, fuel pressure, EGR system, injector(s), HO2S
P0176	Fuel composition sensor – circuit malfunction	Wiring, fuel composition sensor, ECM
P0177	Fuel composition sensor – range/performance problem	Fuel composition sensor
P0178	Fuel composition sensor – low input	Wiring short to earth, fuel composition sensor, ECM
P0179	Fuel composition sensor – high input	Wiring short to positive, fuel composition sensor, ECM
P0180	Fuel temperature sensor A – circuit malfunction	Wiring, fuel temperature sensor, ECM
P0181	Fuel temperature sensor A – range/performance problem	Fuel temperature sensor
P0182	Fuel temperature sensor A – low input	Wiring short to earth, fuel temperature sensor, ECM
P0183	Fuel temperature sensor A – high input	Wiring short to positive, fuel temperature sensor, ECM
P0184	Fuel temperature sensor A – circuit intermittent	Wiring, poor connection, fuel temperature sensor, ECM
P0185	Fuel temperature sensor B – circuit malfunction	Wiring, fuel temperature sensor, ECM
P0186	Fuel temperature sensor B – range/performance problem	Fuel temperature sensor
P0187	Fuel temperature sensor B – low input	Wiring short to earth, fuel temperature sensor, ECM
P0188	Fuel temperature sensor B – high input	Wiring short to positive, fuel temperature sensor, ECM
P0189	Fuel temperature sensor B – circuit intermittent	Wiring, poor connection, fuel temperature sensor, ECM
P0190	Fuel rail pressure (FRP) sensor – circuit malfunction	Wiring, fuel rail pressure sensor, ECM
P0191	Fuel rail pressure (FRP) sensor – range/performance problem	Wiring, FRP sensor



# EOBD trouble code table

Trouble code	Fault location	Probable cause
P0192	Fuel rail pressure (FRP) sensor – low input	Wiring short to earth, FRP sensor
P0193	Fuel rail pressure (FRP) sensor – high input	Wiring short to positive, FRP sensor
P0194	Fuel rail pressure (FRP) sensor – circuit intermittent	Wiring, poor connection, FRP sensor
P0195	Engine oil temperature (EOT) sensor – circuit malfunction	Wiring, EOT sensor, ECM
P0196	Engine oil temperature (EOT) sensor – range/performance problem	EOT sensor
P0197	Engine oil temperature (EOT) sensor – low input	Wiring short to earth, EOT sensor
P0198	Engine oil temperature (EOT) sensor – high input	Wiring short to positive, EOT sensor
P0199	Engine oil temperature (EOT) sensor – circuit intermittent	Wiring, poor connection, EOT sensor, ECM
P0200	Injector – circuit malfunction	Wiring, injector, ECM
P0201	Injector 1 – circuit malfunction	Wiring, injector, ECM
P0202	Injector 2 – circuit malfunction	Wiring, injector, ECM
P0203	Injector 3 – circuit malfunction	Wiring, injector, ECM
P0204	Injector 4 – circuit malfunction	Wiring, injector, ECM
P0205	Injector 5 – circuit malfunction	Wiring, injector, ECM
P0206	Injector 6 – circuit malfunction	Wiring, injector, ECM
P0207	Injector 7 – circuit malfunction	Wiring, injector, ECM
P0208	Injector 8 – circuit malfunction	Wiring, injector, ECM
P0209	Injector 9 – circuit malfunction	Wiring, injector, ECM
P0210	Injector 10 – circuit malfunction	Wiring, injector, ECM
P0211	Injector 11 – circuit malfunction	Wiring, injector, ECM
P0212	Injector 12 – circuit malfunction	Wiring, injector, ECM
P0213	Cold start injector 1 – circuit malfunction	Wiring, cold start injector, ECM
P0214	Cold start injector 2 – circuit malfunction	Wiring, cold start injector, ECM
P0215	Fuel shut-off solenoid – circuit malfunction	Wiring, fuel shut-off solenoid, ECM
P0216	Fuel injection timing control – circuit malfunction	Wiring, fuel injection timing control solenoid, ECM
P0217	Engine over temperature condition	Wiring, cooling system, coolant thermostat, ECT sensor
P0218	Transmission over temperature condition	Wiring, TFT sensor, ECM
P0219	Engine over speed condition	Incorrect gear change
P0220	Throttle position (TP) sensor B/accelerator pedal position (APP) sensor B – circuit malfunction	Wiring, TP/APP sensor, ECM
	Throttle position (TP) switch B/accelerator pedal position (APP) switch B – circuit malfunction	Wiring, TP/APP switch, ECM
P0221	Throttle position (TP) sensor B/accelerator pedal position (APP) sensor B – range/performance problem	Accelerator cable adjustment, TP/APP sensor
	Throttle position (TP) switch B/accelerator pedal position (APP) switch B – range/performance problem	Accelerator cable adjustment, TP/APP switch
P0222	Throttle position (TP) sensor B/accelerator pedal position (APP) sensor B – low input	Wiring short to earth, TP/APP sensor, ECM
	Throttle position (TP) switch B/accelerator pedal position (APP) switch B – low input	Wiring short to earth, TP/APP switch, ECM
P0223	Throttle position (TP) sensor B/accelerator pedal position (APP) sensor B – high input	Wiring short to positive, TP/APP sensor, ECM
	Throttle position (TP) switch B/accelerator pedal position (APP) switch B – high input	Wiring short to positive, TP/APP switch, ECM
P0224	Throttle position (TP) sensor B/accelerator pedal position (APP) sensor B – circuit intermittent	Wiring, poor connection, TP/APP sensor, ECM
	Throttle position (TP) switch B/accelerator pedal position (APP) switch B – circuit intermittent	Wiring, poor connection, TP/APP switch, ECM

## EOBD trouble code table

<b>Trouble code</b>	<b>Fault location</b>	<b>Probable cause</b>
P0225	Throttle position (TP) sensor C/accelerator pedal position (APP) sensor C – circuit malfunction	Wiring, TP/APP sensor, ECM
	Throttle position (TP) switch C/accelerator pedal position (APP) switch C – circuit malfunction	Wiring, TP/APP switch, ECM
P0226	Throttle position (TP) sensor C/accelerator pedal position (APP) sensor C – range/performance problem	Accelerator cable adjustment, TP/APP sensor
	Throttle position (TP) switch C/accelerator pedal position (APP) switch C – range/performance problem	Accelerator cable adjustment, TP/APP switch
P0227	Throttle position (TP) sensor C/accelerator pedal position (APP) sensor C – low input	Wiring short to earth, TP/APP sensor, ECM
	Throttle position (TP) switch C/accelerator pedal position (APP) switch C – low input	Wiring short to earth, TP/APP switch, ECM
P0228	Throttle position (TP) sensor C/accelerator pedal position (APP) sensor C – high input	Wiring short to positive, TP/APP sensor, ECM
	Throttle position (TP) switch C/accelerator pedal position (APP) switch C – high input	Wiring short to positive, TP/APP switch, ECM
P0229	Throttle position (TP) sensor C/accelerator pedal position (APP) sensor C – circuit intermittent	Wiring, poor connection, TP/APP sensor, ECM
	Throttle position (TP) switch C/accelerator pedal position (APP) switch C – circuit intermittent	Wiring, poor connection, TP/APP switch, ECM
P0230	Fuel pump relay – circuit malfunction	Wiring, fuel pump relay, ECM
P0231	Fuel pump relay – circuit low	Wiring short to earth, fuel pump relay, ECM
P0232	Fuel pump relay – circuit high	Wiring short to positive, fuel pump relay, ECM
P0233	Fuel pump relay – circuit intermittent	Wiring, poor connection, fuel pump relay, ECM
P0234	Engine boost condition – limit exceeded	Hose connection(s), wiring, TC wastegate regulating valve, TC wastegate
P0235	Engine boost condition – limit not reached	Hose connection(s), wiring, TC wastegate regulating valve, TC wastegate, TC
P0236	Manifold absolute pressure (MAP) sensor A, TC system – range/performance problem	Intake/exhaust leak, hose connection(s), MAP sensor
P0237	Manifold absolute pressure (MAP) sensor A, TC system – low input	Wiring short to earth, MAP sensor, ECM
P0238	Manifold absolute pressure (MAP) sensor A, TC system – high input	Wiring short to positive, MAP sensor, ECM
P0239	Manifold absolute pressure (MAP) sensor B, TC system – circuit malfunction	Wiring, MAP sensor, ECM
P0240	Manifold absolute pressure (MAP) sensor B, TC system – range/performance problem	Intake/exhaust leak, hose connection(s), MAP sensor
P0241	Manifold absolute pressure (MAP) sensor B, TC system – low input	Wiring short to earth, MAP sensor, ECM
P0242	Manifold absolute pressure (MAP) sensor B, TC system – high input	Wiring short to positive, MAP sensor, ECM
P0243	Turbocharger (TC) wastegate regulating valve A – circuit malfunction	Wiring, TC wastegate regulating valve, ECM
P0244	Turbocharger (TC) wastegate regulating valve A – range/performance problem	TC wastegate regulating valve
P0245	Turbocharger (TC) wastegate regulating valve A – circuit low	Wiring short to earth, TC wastegate regulating valve, ECM
P0246	Turbocharger (TC) wastegate regulating valve A – circuit high	Wiring short to positive, TC wastegate regulating valve, ECM
P0247	Turbocharger (TC) wastegate regulating valve B – circuit malfunction	Wiring, TC wastegate regulating valve, ECM

## EOBD trouble code table

Trouble code	Fault location	Probable cause
P0248	Turbocharger (TC) wastegate regulating valve B – range/performance problem	TC wastegate regulating valve
P0249	Turbocharger (TC) wastegate regulating valve B – circuit low	Wiring short to earth, TC wastegate regulating valve, ECM
P0250	Turbocharger (TC) wastegate regulating valve B – circuit high	Wiring short to positive, TC wastegate regulating valve, ECM
P0251	Injection pump A, rotor/cam – circuit malfunction	Wiring, injection pump, ECM
P0252	Injection pump A, rotor/cam – range/performance problem	Injection pump
P0253	Injection pump A, rotor/cam – circuit low	Wiring short to earth, injection pump, ECM
P0254	Injection pump A, rotor/cam – circuit high	Wiring short to positive, injection pump, ECM
P0255	Injection pump A, rotor/cam – circuit intermittent	Wiring, poor connection, injection pump, ECM
P0256	Injection pump B, rotor/cam – circuit malfunction	Wiring, injection pump, ECM
P0257	Injection pump B, rotor/cam – range/performance problem	Injection pump
P0258	Injection pump B, rotor/cam – circuit low	Wiring short to earth, injection pump, ECM
P0259	Injection pump B, rotor/cam – circuit high	Wiring short to positive, injection pump, ECM
P0260	Injection pump B, rotor/cam – circuit intermittent	Wiring, poor connection, injection pump, ECM
P0261	Injector 1 – circuit low	Wiring short to earth, injector, ECM
P0262	Injector 1 – circuit high	Wiring short to positive, injector, ECM
P0263	Cylinder 1 – contribution/balance fault	Wiring, fuel system, ECM
P0264	Injector 2 – circuit low	Wiring short to earth, injector, ECM
P0265	Injector 2 – circuit high	Wiring short to positive, injector, ECM
P0266	Cylinder 2 – contribution/balance fault	Wiring, fuel system, ECM
P0267	Injector 3 – circuit low	Wiring short to earth, injector, ECM
P0268	Injector 3 – circuit high	Wiring short to positive, injector, ECM
P0269	Cylinder 3 – contribution/balance fault	Wiring, fuel system, ECM
P0270	Injector 4 – circuit low	Wiring short to earth, injector, ECM
P0271	Injector 4 – circuit high	Wiring short to positive, injector, ECM
P0272	Cylinder 4 – contribution/balance fault	Wiring, fuel system, ECM
P0273	Injector 5 – circuit low	Wiring short to earth, injector, ECM
P0274	Injector 5 – circuit high	Wiring short to positive, injector, ECM
P0275	Cylinder 5 – contribution/balance fault	Wiring, fuel system, ECM
P0276	Injector 6 – circuit low	Wiring short to earth, injector, ECM
P0277	Injector 6 – circuit high	Wiring short to positive, injector, ECM
P0278	Cylinder 6 – contribution/balance fault	Wiring, fuel system, ECM
P0279	Injector 7 – circuit low	Wiring short to earth, injector, ECM
P0280	Injector 7 – circuit high	Wiring short to positive, injector, ECM
P0281	Cylinder 7 – contribution/balance fault	Wiring, fuel system, ECM
P0282	Injector 8 – circuit low	Wiring short to earth, injector, ECM
P0283	Injector 8 – circuit high	Wiring short to positive, injector, ECM
P0284	Cylinder 8 – contribution/balance fault	Wiring, fuel system, ECM
P0285	Injector 9 – circuit low	Wiring short to earth, injector, ECM
P0286	Injector 9 – circuit high	Wiring short to positive, injector, ECM
P0287	Cylinder 9 – contribution/balance fault	Wiring, fuel system, ECM
P0288	Injector 10 – circuit low	Wiring short to earth, injector, ECM
P0289	Injector 10 – circuit high	Wiring short to positive, injector, ECM

## EOBD trouble code table

<b>Trouble code</b>	<b>Fault location</b>	<b>Probable cause</b>
P0290	Cylinder 10 – contribution/balance fault	Wiring, fuel system, ECM
P0291	Injector 11 – circuit low	Wiring short to earth, injector, ECM
P0292	Injector 11 – circuit high	Wiring short to positive, injector, ECM
P0293	Cylinder 11 – contribution/balance fault	Wiring, fuel system, ECM
P0294	Injector 12 – circuit low	Wiring short to earth, injector, ECM
P0295	Injector 12 – circuit high	Wiring short to positive, injector, ECM
P0296	Cylinder 12 – contribution/balance fault	Wiring, fuel system, ECM
P0297	Vehicle over-speed condition	Wiring, VSS, mechanical fault
P0298	Engine oil temperature too high	Wiring, EOT sensor, mechanical fault
P0299	Turbo/super charger – low boost	Mechanical fault
P0300	Random/multiple cylinder(s) – misfire detected	Spark plug(s), HT lead(s), injector(s), ignition coil(s), low compression, wiring
P0301	Cylinder 1 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P0302	Cylinder 2 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P0303	Cylinder 3 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P0304	Cylinder 4 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P0305	Cylinder 5 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P0306	Cylinder 6 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P0307	Cylinder 7 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P0308	Cylinder 8 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P0309	Cylinder 9 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P0310	Cylinder 10 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P0311	Cylinder 11 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P0312	Cylinder 12 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P0313	Misfire detected – low fuel level	Fuel system, mechanical fault
P0314	Single cylinder misfire – cylinder not specified	Engine mechanical fault, wiring, ignition/fuel system, injector
P0315	Crankshaft position system – variation not learned	Engine mechanical fault, wiring
P0316	Misfire detected during start-up – first 1000 revolutions	Engine mechanical fault, wiring, ignition/fuel system, injector
P0317	Rough road hardware not present	Wiring, ECM
P0318	Rough road sensor signal A – circuit malfunction	Wiring, rough road sensor A, mechanical fault
P0319	Rough road sensor signal B – circuit malfunction	Wiring, rough road sensor B, mechanical fault
P0320	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – circuit malfunction	Wiring, CKP/RPM sensor, ECM
P0321	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – range/performance problem	Air gap, metal particle contamination, insecure sensor/rotor, wiring, CKP/RPM sensor
P0322	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal	Wiring, CKP/RPM sensor, ECM

# EOBD trouble code table

Trouble code	Fault location	Probable cause
P0323	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – circuit intermittent	Wiring, poor connection, CKP/RPM sensor, ECM
P0324	Knock control system error	Wiring, poor connection, KS, ECM
P0325	Knock sensor (KS) 1, bank 1 – circuit malfunction	Wiring, poor connection, KS
P0326	Knock sensor (KS) 1, bank 1 – range/performance problem	Wiring, KS incorrectly tightened, KS
P0327	Knock sensor (KS) 1, bank 1 – low input	Insecure KS, poor connection, wiring short to earth, incorrectly tightened, KS, ECM
P0328	Knock sensor (KS) 1, bank 1 – high input	Wiring short to positive, KS incorrectly tightened, KS, ECM
P0329	Knock sensor (KS) 1, bank 1 – circuit intermittent	Wiring, poor connection, KS, ECM
P0330	Knock sensor (KS) 2, bank 2 – circuit malfunction	Wiring, KS, ECM
P0331	Knock sensor (KS) 2, bank 2 – range/performance problem	Wiring, KS incorrectly tightened, KS
P0332	Knock sensor (KS) 2, bank 2 – low input	Insecure KS, poor connection, wiring short to earth, KS incorrectly tightened, KS, ECM
P0333	Knock sensor (KS) 2, bank 2 – high input	Wiring short to positive, KS incorrectly tightened, KS, ECM
P0334	Knock sensor (KS) 2, bank 2 – circuit intermittent	Wiring, poor connection, KS, ECM
P0335	Crankshaft position (CKP) sensor – circuit malfunction	Wiring, CKP sensor, ECM
P0336	Crankshaft position (CKP) sensor – range/performance problem	Insecure sensor/rotor, air gap, wiring, CKP sensor
P0337	Crankshaft position (CKP) sensor – low input	Wiring short to earth, CKP sensor, ECM
P0338	Crankshaft position (CKP) sensor – high input	Wiring short to positive, CKP sensor, ECM
P0339	Crankshaft position (CKP) sensor – circuit intermittent	Wiring, poor connection, CKP sensor, ECM
P0340	Camshaft position (CMP) sensor A, bank 1 – circuit malfunction	Wiring, CMP sensor, ECM
P0341	Camshaft position (CMP) sensor A, bank 1 – range/performance problem	Insecure sensor/rotor, air gap, wiring, CMP sensor
P0342	Camshaft position (CMP) sensor A, bank 1 – low input	Wiring short to earth, CMP sensor, ECM
P0343	Camshaft position (CMP) sensor A, bank 1 – high input	Wiring short to positive, CMP sensor, ECM
P0344	Camshaft position (CMP) sensor A, bank 1 – circuit intermittent	Wiring, poor connection, CMP sensor, ECM
P0345	Camshaft position (CMP) sensor A, bank 2 – circuit malfunction	Wiring, CMP sensor, ECM
P0346	Camshaft position (CMP) sensor A, bank 2 – range/performance problem	Insecure sensor/rotor, air gap, wiring, CMP sensor
P0347	Camshaft position (CMP) sensor A, bank 2 – low input	Wiring short to earth, CMP sensor, ECM
P0348	Camshaft position (CMP) sensor A, bank 2 – high input	Wiring short to positive, CMP sensor, ECM
P0349	Camshaft position (CMP) sensor A, bank 2 – circuit intermittent	Wiring, poor connection, CMP sensor, ECM
P0350	Ignition coil, primary/secondary – circuit malfunction	Wiring, ignition coil, ECM
P0351	Ignition coil A, primary/secondary – circuit malfunction	Wiring, ignition coil, ECM
P0352	Ignition coil B, primary/secondary – circuit malfunction	Wiring, ignition coil, ECM
P0353	Ignition coil C, primary/secondary – circuit malfunction	Wiring, ignition coil, ECM
P0354	Ignition coil D, primary/secondary – circuit malfunction	Wiring, ignition coil, ECM
P0355	Ignition coil E, primary/secondary – circuit malfunction	Wiring, ignition coil, ECM
P0356	Ignition coil F, primary/secondary – circuit malfunction	Wiring, ignition coil, ECM
P0357	Ignition coil G, primary/secondary – circuit malfunction	Wiring, ignition coil, ECM
P0358	Ignition coil H, primary/secondary – circuit malfunction	Wiring, ignition coil, ECM



## EOBD trouble code table

<b>Trouble code</b>	<b>Fault location</b>	<b>Probable cause</b>
P0359	Ignition coil I, primary/secondary – circuit malfunction	Wiring, ignition coil, ECM
P0360	Ignition coil J, primary/secondary – circuit malfunction	Wiring, ignition coil, ECM
P0361	Ignition coil K, primary/secondary – circuit malfunction	Wiring, ignition coil, ECM
P0362	Ignition coil L, primary/secondary – circuit malfunction	Wiring, ignition coil, ECM
P0363	Misfire detected – fuelling disabled	Fuel system, mechanical fault
P0365	Camshaft position (CMP) sensor B, bank 1 – circuit malfunction	Wiring, poor connection, CMP sensor, ECM
P0366	Camshaft position (CMP) sensor B, bank 1 – circuit range/performance	Wiring, poor connection, CMP sensor
P0367	Camshaft position (CMP) sensor B, bank 1 – circuit low input	Wiring short to earth, CMP sensor, ECM
P0368	Camshaft position (CMP) sensor B, bank 1 – circuit high input	Wiring short to positive, CMP sensor, ECM
P0369	Camshaft position (CMP) sensor B, bank 1 – circuit intermittent	Wiring, poor connection, ECM
P0370	Timing reference, high resolution signal A – malfunction	Wiring, CKP/RPM/CMP sensor, ECM
P0371	Timing reference, high resolution signal A – too many pulses	Wiring, CKP/RPM/CMP sensor, ECM
P0372	Timing reference, high resolution signal A – too few pulses	Wiring, CKP/RPM/CMP sensor, ECM
P0373	Timing reference, high resolution signal A – intermittent erratic pulses	Wiring, poor connection, CKP/RPM/CMP sensor, ECM
P0374	Timing reference, high resolution signal A – no pulses	Wiring, CKP/RPM/CMP sensor, ECM
P0375	Timing reference, high resolution signal B – malfunction	Wiring, CKP/RPM/CMP sensor, ECM
P0376	Timing reference, high resolution signal B – too many pulses	Wiring, CKP/RPM/CMP sensor, ECM
P0377	Timing reference, high resolution signal B – too few pulses	Wiring, CKP/RPM/CMP sensor, ECM
P0378	Timing reference, high resolution signal B – intermittent erratic pulses	Wiring, poor connection, CKP/RPM/CMP sensor, ECM
P0379	Timing reference, high resolution signal B – no pulses	Wiring, CKP/RPM/CMP sensor, ECM
P0380	Glow plugs, circuit A – malfunction	Wiring, glow plug relay, fuse, glow plugs, ECM
P0381	Glow plug warning lamp – circuit malfunction	Wiring, glow plug warning lamp, ECM
P0382	Glow plugs, circuit B – malfunction	Wiring, glow plug relay, glow plugs, ECM
P0383	Glow plug control module – circuit low	Wiring short to earth, glow plug control module
P0384	Glow plug control module – circuit high	Wiring short to positive, glow plug control module
P0385	Crankshaft position (CKP) sensor B – circuit malfunction	Wiring, CKP sensor, ECM
P0386	Crankshaft position (CKP) sensor B – range/performance problem	Insecure sensor/rotor, air gap, wiring, CKP sensor
P0387	Crankshaft position (CKP) sensor B – low input	Wiring short to earth, CKP sensor, ECM
P0388	Crankshaft position (CKP) sensor B – high input	Wiring short to positive, CKP sensor, ECM
P0389	Crankshaft position (CKP) sensor B – circuit intermittent	Wiring, poor connection, CKP sensor, ECM
P0390	Camshaft position (CMP) sensor B, bank 2 – circuit malfunction	Wiring, poor connection, CMP sensor, ECM
P0391	Camshaft position (CMP) sensor B, bank 2 – circuit range/performance	Wiring, poor connection, CMP sensor
P0392	Camshaft position (CMP) sensor B, bank 2 – circuit low input	Wiring short to earth, CMP sensor, ECM
P0393	Camshaft position (CMP) sensor B, bank 2 – circuit high input	Wiring short to positive, CMP sensor, ECM
P0394	Camshaft position (CMP) sensor B, bank 2 – circuit intermittent	Wiring, poor connection, ECM

# EOBD trouble code table

Trouble code	Fault location	Probable cause
P0400	Exhaust gas recirculation (EGR) system – flow malfunction	Hose leak/blockage, basic setting not carried out (if applicable), wiring, EGR valve, EGR solenoid, ECM
P0401	Exhaust gas recirculation (EGR) system – insufficient flow detected	Hose leak/blockage, basic setting not carried out (if applicable), wiring, EGR valve, EGR solenoid, ECM
P0402	Exhaust gas recirculation (EGR) system – excessive flow detected	Hose leak/blockage, basic setting not carried out (if applicable), wiring, EGR valve, EGR solenoid, ECM
P0403	Exhaust gas recirculation (EGR) – circuit malfunction	Wiring, EGR solenoid, ECM
P0404	Exhaust gas recirculation (EGR) system – range/performance problem	Hose leak/blockage, wiring, EGR valve/solenoid
P0405	Exhaust gas recirculation (EGR) valve position sensor A – low input	Wiring short to earth, EGR valve position sensor, ECM
P0406	Exhaust gas recirculation (EGR) valve position sensor A – high input	Wiring short to positive, EGR valve position sensor, ECM
P0407	Exhaust gas recirculation (EGR) valve position sensor B – low input	Wiring short to earth, EGR valve position sensor, ECM
P0408	Exhaust gas recirculation (EGR) valve position sensor B – high input	Wiring short to positive, EGR valve position sensor, ECM
P0409	Exhaust gas recirculation (EGR) sensor A – circuit malfunction	Wiring, poor connection, EGR sensor, ECM
P0410	Secondary air injection (AIR) system – malfunction	Wiring, AIR valve, AIR solenoid, ECM
P0411	Secondary air injection (AIR) system – incorrect flow detected	AIR pump, AIR valve, AIR hose(s)
P0412	Secondary air injection (AIR) solenoid A – circuit malfunction	Wiring, AIR solenoid, ECM
P0413	Secondary air injection (AIR) solenoid A – open circuit	Wiring open circuit, AIR solenoid, ECM
P0414	Secondary air injection (AIR) solenoid A – short circuit	Wiring short circuit, AIR solenoid, ECM
P0415	Secondary air injection (AIR) solenoid B – circuit malfunction	Wiring, AIR solenoid, ECM
P0416	Secondary air injection (AIR) solenoid B – open circuit	Wiring open circuit, AIR solenoid, ECM
P0417	Secondary air injection (AIR) solenoid B – short circuit	Wiring short circuit, AIR solenoid, ECM
P0418	Secondary air injection (AIR) pump relay A – circuit malfunction	Wiring, AIR pump relay, ECM
P0419	Secondary air injection (AIR) pump relay B – circuit malfunction	Wiring, AIR pump relay, ECM
P0420	Catalytic converter system, bank 1 – efficiency below threshold	Catalytic converter, wiring, HO2S 2
P0421	Warm up catalytic converter, bank 1 – efficiency below threshold	Catalytic converter, wiring, HO2S 2
P0422	Main catalytic converter, bank 1 – efficiency below threshold	Catalytic converter, wiring, HO2S 2
P0423	Heated catalytic converter, bank 1 – efficiency below threshold	Catalytic converter, wiring, HO2S 2
P0424	Heated catalytic converter, bank 1 – temperature below threshold	Catalytic converter, wiring, HO2S 2
P0425	Catalytic converter temperature sensor, bank 1	Wiring, poor connection, catalytic converter temperature sensor, ECM
P0426	Catalytic converter temperature sensor, bank 1 – range/performance	Wiring, poor connection, catalytic converter temperature sensor
P0427	Catalytic converter temperature sensor, bank 1 – low input	Wiring short to earth, catalytic converter temperature sensor, ECM
P0428	Catalytic converter temperature sensor, bank 1 – high input	Wiring short to positive, catalytic converter temperature sensor, ECM
P0429	Catalytic converter heater, bank 1 – control circuit malfunction	Wiring, relay, ECM

## EOBD trouble code table

<b>Trouble code</b>	<b>Fault location</b>	<b>Probable cause</b>
P0430	Catalytic converter system, bank 2 – efficiency below threshold	Catalytic converter, wiring, HO2S 2
P0431	Warm up catalytic converter, bank 2 – efficiency below threshold	Catalytic converter, wiring, HO2S 2
P0432	Main catalytic converter, bank 2 – efficiency below threshold	Catalytic converter, wiring, HO2S 2
P0433	Heated catalytic converter, bank 2 – efficiency below threshold	Catalytic converter, wiring, HO2S 2
P0434	Heated catalytic converter, bank 2 – temperature below threshold	Catalytic converter, wiring, HO2S 2
P0435	Catalytic converter temperature sensor, bank 2	Wiring, poor connection, catalytic converter temperature sensor, ECM
P0436	Catalytic converter temperature sensor, bank 2 – range/performance	Wiring, poor connection, catalytic converter temperature sensor
P0437	Catalytic converter temperature sensor, bank 2 – low input	Wiring short to earth, catalytic converter temperature sensor, ECM
P0438	Catalytic converter temperature sensor, bank 2 – high input	Wiring short to positive, catalytic converter temperature sensor, ECM
P0439	Catalytic converter heater, bank 2 – control circuit malfunction	Wiring, relay, ECM
P0440	Evaporative emission (EVAP) system – malfunction	Hose connection(s), intake leak, EVAP canister purge valve
P0441	Evaporative emission (EVAP) system – incorrect flow detected	Hose connection(s), intake leak, EVAP canister purge valve
P0442	Evaporative emission (EVAP) system – small leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
P0443	Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring, EVAP canister purge valve, ECM
P0444	Evaporative emission (EVAP) canister purge valve – open circuit	Wiring open circuit, EVAP canister purge valve, ECM
P0445	Evaporative emission (EVAP) canister purge valve – short circuit	Wiring short circuit, EVAP canister purge valve, ECM
P0446	Evaporative emission (EVAP) system, vent control – circuit malfunction	Wiring, EVAP canister purge valve, ECM
P0447	Evaporative emission (EVAP) system, vent control – open circuit	Wiring open circuit, EVAP canister purge valve, ECM
P0448	Evaporative emission (EVAP) system, vent control – short circuit	Wiring short circuit, EVAP canister purge valve, ECM
P0449	Evaporative emission (EVAP) system, vent valve – circuit malfunction	Wiring, EVAP canister purge valve, ECM
P0450	Evaporative emission (EVAP) pressure sensor – circuit malfunction	Wiring, EVAP pressure sensor, ECM
P0451	Evaporative emission (EVAP) pressure sensor – range/performance problem	EVAP pressure sensor
P0452	Evaporative emission (EVAP) pressure sensor – low input	Wiring short to earth, EVAP pressure sensor, ECM
P0453	Evaporative emission (EVAP) pressure sensor – high input	Wiring short to positive, EVAP pressure sensor, ECM
P0454	Evaporative emission (EVAP) pressure sensor – circuit intermittent	Wiring, poor connection, EVAP pressure sensor, ECM
P0455	Evaporative emission (EVAP) system – large leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
P0456	Evaporative emission (EVAP) system – very small leak detected	Mechanical fault, hose connection(s), EVAP pressure sensor
P0457	Evaporative emission (EVAP) system – leak detected (filler cap loose/off)	Mechanical fault, hose connection(s), EVAP pressure sensor



# EOBD trouble code table

Trouble code	Fault location	Probable cause
P0458	Evaporative emission (EVAP) system, EVAP valve – circuit low	Wiring short to earth, EVAP valve
P0459	Evaporative emission (EVAP) system, EVAP valve – circuit high	Wiring short to positive, EVAP valve
P0460	Fuel tank level sensor – circuit malfunction	Wiring, fuel tank level sensor, ECM
P0461	Fuel tank level sensor – range/performance problem	Wiring, fuel tank level sensor
P0462	Fuel tank level sensor – low input	Wiring short to earth, fuel tank level sensor, ECM
P0463	Fuel tank level sensor – high input	Wiring short to positive, fuel tank level sensor, ECM
P0464	Fuel tank level sensor – circuit intermittent	Wiring, poor connection, fuel tank level sensor, ECM
P0465	Evaporative emission (EVAP) canister purge flow sensor – circuit malfunction	Wiring, EVAP canister purge flow sensor, ECM
P0466	Evaporative emission (EVAP) canister purge flow sensor – range/performance problem	EVAP canister purge flow sensor
P0467	Evaporative emission (EVAP) canister purge flow sensor – low input	Wiring short to earth, EVAP canister purge flow sensor, ECM
P0468	Evaporative emission (EVAP) canister purge flow sensor – high input	Wiring short to positive, EVAP canister purge flow sensor, ECM
P0469	Evaporative emission (EVAP) canister purge flow sensor – circuit intermittent	Wiring, poor connection, EVAP canister purge flow sensor, ECM
P0470	Exhaust gas pressure sensor – circuit malfunction	Wiring, exhaust gas pressure sensor, ECM
P0471	Exhaust gas pressure sensor – range/performance problem	Exhaust gas pressure sensor
P0472	Exhaust gas pressure sensor – low input	Wiring short to earth, exhaust gas pressure sensor, ECM
P0473	Exhaust gas pressure sensor – high input	Wiring short to positive, exhaust gas pressure sensor, ECM
P0474	Exhaust gas pressure sensor – circuit intermittent	Wiring, poor connection, exhaust gas pressure sensor, ECM
P0475	Exhaust gas pressure control valve – circuit malfunction	Wiring, exhaust gas pressure control valve, ECM
P0476	Exhaust gas pressure control valve – range/performance problem	Exhaust gas pressure control valve
P0477	Exhaust gas pressure control valve – low input	Wiring short to earth, exhaust gas pressure control valve, ECM
P0478	Exhaust gas pressure control valve – high input	Wiring short to positive, exhaust gas pressure control valve, ECM
P0479	Exhaust gas pressure control valve – circuit intermittent	Wiring, poor connection, exhaust gas pressure control valve, ECM
P0480	Engine coolant blower motor 1 – circuit malfunction	Wiring, engine coolant blower motor, ECM
P0481	Engine coolant blower motor 2 – circuit malfunction	Wiring, engine coolant blower motor, ECM
P0482	Engine coolant blower motor 3 – circuit malfunction	Wiring, engine coolant blower motor, ECM
P0483	Engine coolant blower motor, rationality check – malfunction	Wiring, engine coolant blower motor, ECM
P0484	Engine coolant blower motor – circuit over current	Wiring, engine coolant blower motor, ECM
P0485	Engine coolant blower motor, power/earth – circuit malfunction	Wiring, engine coolant blower motor, ECM
P0486	Exhaust gas recirculation (EGR) valve position sensor B – circuit malfunction	Wiring, poor connection, EGR valve position sensor, ECM
P0487	Exhaust gas recirculation (EGR) system, throttle position control – circuit malfunction	Wiring, poor connection, ECM
P0488	Exhaust gas recirculation (EGR) system, throttle position control – range/performance	Wiring, poor connection, ECM
P0489	Exhaust gas recirculation (EGR) system – circuit low	Wiring short to earth, EGR valve

## EOBD trouble code table

Trouble code	Fault location	Probable cause
P0490	Exhaust gas recirculation (EGR) system – circuit high	Wiring short to positive, EGR valve
P0491	Secondary air injection (AIR) system, bank 1 – malfunction	Wiring, AIR solenoid, hose connections, mechanical fault
P0492	Secondary air injection (AIR) system, bank 2 – malfunction	Wiring, AIR solenoid, hose connections, mechanical fault
P0493	Engine coolant blower motor over-speed (clutch locked)	Blower motor clutch, mechanical fault
P0494	Engine coolant blower motor speed – low	Wiring, relay, blower motor, mechanical fault
P0495	Engine coolant blower motor speed – high	Wiring, relay, blower motor, mechanical fault
P0496	Evaporative emission (EVAP) system – high purge flow	Wiring, EVAP valve, mechanical fault
P0497	Evaporative emission (EVAP) system – low purge flow	Wiring, EVAP valve, hoses blocked, mechanical fault
P0498	Evaporative emission (EVAP) system, vent control – circuit low	Wiring short to earth, EVAP valve
P0499	Evaporative emission (EVAP) system, vent control – circuit high	Wiring short to positive, EVAP valve
P0500	Vehicle speed sensor (VSS) – circuit malfunction	Wiring, VSS, ECM
P0501	Vehicle speed sensor (VSS) – range/performance problem	Wiring, speedometer, VSS, CAN data bus
P0502	Vehicle speed sensor (VSS) – low input	Wiring short to earth, VSS, ECM
P0503	Vehicle speed sensor (VSS) – intermittent/erratic/high input	Wiring, poor connection, other connected system, instrument panel, VSS
P0504	Brake switch – A/B correlation	Wiring, mechanical fault
P0505	Idle speed control (ISC) system – malfunction	Wiring, ISC actuator/IAC valve, throttle motor, throttle valve tight/sticking, ECM
P0506	Idle speed control (ISC) system – rpm lower than expected	Wiring, ISC actuator/IAC valve, throttle motor, throttle valve tight/sticking, ECM
P0507	Idle speed control (ISC) system – rpm higher than expected	Wiring, ISC actuator/IAC valve, throttle motor, throttle valve tight/sticking, ECM
P0508	Idle air control (IAC) – circuit low	Wiring short to earth, IAC valve, ECM
P0509	Idle air control (IAC) – circuit high	Wiring short to positive, IAC valve, ECM
P0510	Closed throttle position (CTP) switch – circuit malfunction	Wiring, CTP switch, ECM
P0511	Idle air control (IAC) – circuit malfunction	Wiring, poor connection, IAC valve, ECM
P0512	Starter request circuit – malfunction	Wiring, immobilizer system, relay
P0513	Incorrect immobilizer key	Immobilizer system
P0514	Battery temperature sensor – circuit range/performance	Wiring, poor connection, battery temperature sensor
P0515	Battery temperature sensor – circuit malfunction	Wiring, poor connection, battery temperature sensor
P0516	Battery temperature sensor – circuit low	Wiring short to earth, battery temperature sensor, ECM
P0517	Battery temperature sensor – circuit high	Wiring short to positive, battery temperature sensor, ECM
P0518	Idle air control (IAC) – circuit intermittent	Wiring, poor connection, IAC valve, ECM
P0519	Idle air control (IAC) – circuit performance	Wiring, poor connection, IAC valve, ECM
P0520	Engine oil pressure sensor/switch – circuit malfunction	Wiring, engine oil pressure sensor/switch, ECM
P0521	Engine oil pressure sensor/switch – range/performance problem	Engine oil pressure sensor/switch
P0522	Engine oil pressure sensor/switch – low voltage	Wiring short to earth, engine oil pressure sensor/switch, ECM
P0523	Engine oil pressure sensor/switch – high voltage	Wiring short to positive, engine oil pressure sensor/switch, ECM
P0524	Engine oil pressure too low	Mechanical fault

## EOBD trouble code table

Trouble code	Fault location	Probable cause
P0525	Cruise control system, actuator control – circuit range/performance	Wiring, poor connection, cruise control actuator
P0526	Engine coolant blower motor speed sensor – circuit malfunction	Wiring, poor connection, blower motor speed sensor, ECM
P0527	Engine coolant blower motor speed sensor – circuit range/performance	Wiring, poor connection, blower motor speed sensor
P0528	Engine coolant blower motor speed sensor – no signal	Wiring, poor connection, blower motor speed sensor, ECM
P0529	Engine coolant blower motor speed sensor – circuit intermittent	Wiring, poor connection, ECM
P0530	AC refrigerant pressure sensor – circuit malfunction	Wiring, AC refrigerant pressure sensor, ECM
P0531	AC refrigerant pressure sensor – range/performance problem	AC refrigerant pressure sensor
P0532	AC refrigerant pressure sensor – low input	AC refrigerant pressure too low (incorrectly charged), wiring, AC refrigerant pressure sensor, ECM
P0533	AC refrigerant pressure sensor – high input	AC refrigerant pressure too high (cooling fault/incorrectly charged), wiring, AC refrigerant pressure sensor, ECM
P0534	AC refrigerant charge loss	AC leak, wiring, AC refrigerant pressure sensor
P0535	AC evaporator temperature sensor – circuit malfunction	Wiring, poor connection, AC evaporator temperature sensor, ECM
P0536	AC evaporator temperature sensor – circuit range/performance	Wiring, poor connection, AC evaporator temperature sensor, ECM
P0537	AC evaporator temperature sensor – circuit low	Wiring short to earth, AC evaporator temperature sensor, ECM
P0538	AC evaporator temperature sensor – circuit high	Wiring short to positive, AC evaporator temperature sensor, ECM
P0539	AC evaporator temperature sensor – circuit intermittent	Wiring, poor connection, AC evaporator temperature sensor, ECM
P0540	Intake air heater A – circuit malfunction	Wiring, relay, intake air heater
P0541	Intake air heater A – circuit low	Wiring short to earth, intake air heater
P0542	Intake air heater A – circuit high	Wiring short to positive, intake air heater
P0543	Intake air heater A – circuit open	Wiring, intake air heater
P0544	Exhaust gas recirculation temperature (EGRT) sensor, bank 1 – circuit malfunction	Wiring, EGRT sensor, ECM
P0545	Exhaust gas recirculation temperature (EGRT) sensor, bank 1 – low input	Wiring short to earth, EGRT sensor, ECM
P0546	Exhaust gas recirculation temperature (EGRT) sensor, bank 1 – high input	Wiring short to positive, EGRT sensor, ECM
P0547	Exhaust gas temperature sensor, bank 2 sensor 1 – circuit malfunction	Wiring, poor connection, exhaust gas temperature sensor, ECM
P0548	Exhaust gas temperature sensor, bank 2 sensor 1 – circuit low	Wiring short to earth, exhaust gas temperature sensor, ECM
P0549	Exhaust gas temperature sensor, bank 2 sensor 1 – circuit high	Wiring short to positive, exhaust gas temperature sensor, ECM
P0550	Power steering pressure (PSP) sensor/switch – circuit malfunction	Wiring, PSP sensor/switch, ECM
P0551	Power steering pressure (PSP) sensor/switch – range/performance problem	PAS system, PSP sensor/switch
P0552	Power steering pressure (PSP) sensor/switch – low input	Wiring short to earth, PSP sensor/switch, ECM
P0553	Power steering pressure (PSP) sensor/switch – high input	Wiring short to positive, PSP sensor/switch, ECM
P0554	Power steering pressure (PSP) sensor/switch – circuit intermittent	Wiring, poor connection, PSP sensor/switch, ECM

## EOBD trouble code table

<b>Trouble code</b>	<b>Fault location</b>	<b>Probable cause</b>
P0555	Brake servo pressure sensor – circuit malfunction	Wiring, poor connection, brake servo pressure sensor, ECM
P0556	Brake servo pressure sensor – circuit range/performance	Wiring, poor connection, brake servo pressure sensor, ECM
P0557	Brake servo pressure sensor – circuit low input	Wiring short to earth, brake servo pressure sensor, ECM
P0558	Brake servo pressure sensor – circuit high input	Wiring short to positive, brake servo pressure sensor, ECM
P0559	Brake servo pressure sensor – circuit intermittent	Wiring, poor connection, brake servo pressure sensor, ECM
P0560	System voltage – malfunction	Wiring, poor connection, battery, alternator
P0561	System voltage – unstable	Wiring, poor connection, battery, alternator
P0562	System voltage – low	Wiring, poor connection, battery, alternator
P0563	System voltage – high	Alternator
P0564	Cruise control system, multi-function switch input A – circuit malfunction	Wiring, poor connection, multi-function switch, mechanical fault
P0565	Cruise control master switch, ON signal – malfunction	Wiring, cruise control master switch, ECM
P0566	Cruise control master switch, OFF signal – malfunction	Wiring, cruise control master switch, ECM
P0567	Cruise control selector switch, RESUME signal – malfunction	Wiring, cruise control selector switch, ECM
P0568	Cruise control master switch, SET signal – malfunction	Wiring, cruise control master switch, ECM
P0569	Cruise control selector switch, COAST signal – malfunction	Wiring, cruise control selector switch, ECM
P0570	Cruise control system, APP sensor signal – malfunction	Wiring, APP sensor, ECM
P0571	Cruise/brake switch A – circuit malfunction	Wiring, cruise/brake switch, ECM
P0572	Cruise/brake switch A – circuit low	Wiring short to earth, cruise/brake switch, ECM
P0573	Cruise/brake switch A – circuit high	Wiring short to positive, cruise/brake switch, ECM
P0574	Cruise control system – vehicle speed too high	Mechanical fault
P0575	Cruise control system – input circuit malfunction	Wiring, poor connection, mechanical fault, ECM
P0576	Cruise control system – input circuit low	Wiring short to earth
P0577	Cruise control system – input circuit high	Wiring short to positive
P0578	Cruise control system, multi-function switch input A – circuit stuck	Wiring, poor connection, multi-function switch, mechanical fault
P0579	Cruise control system, multi-function switch input A – circuit range/performance	Wiring, poor connection, multi-function switch, mechanical fault
P0580	Cruise control system, multi-function switch input A – circuit low	Wiring short to earth, multi-function switch, mechanical fault
P0581	Cruise control system, multi-function switch input A – circuit high	Wiring short to positive, multi-function switch, mechanical fault
P0582	Cruise control system, vacuum control – circuit open	Wiring, vacuum control solenoid
P0583	Cruise control system, vacuum control – circuit low	Wiring short to earth, vacuum control solenoid
P0584	Cruise control system, vacuum control – circuit high	Wiring short to positive, vacuum control solenoid
P0585	Cruise control system, multi-function switch input A/B – correlation	Mechanical fault
P0586	Cruise control system, vent control – circuit open	Wiring, vent control solenoid
P0587	Cruise control system, vent control – circuit low	Wiring short to earth, vent control solenoid
P0588	Cruise control system, vent control – circuit high	Wiring short to positive, vent control solenoid
P0589	Cruise control system, multi-function switch input B – circuit malfunction	Wiring, poor connection, multi-function switch, mechanical fault



## EOBD trouble code table

Trouble code	Fault location	Probable cause
P0590	Cruise control system, multi-function switch input B – circuit stuck	Wiring, poor connection, multi-function switch, mechanical fault
P0591	Cruise control system, multi-function switch input B – circuit range/performance	Wiring, poor connection, multi-function switch, mechanical fault
P0592	Cruise control system, multi-function switch input B – circuit low	Wiring short to earth, multi-function switch, mechanical fault
P0593	Cruise control system, multi-function switch input B – circuit high	Wiring short to positive, multi-function switch, mechanical fault
P0594	Cruise control system, actuator control – circuit open	Wiring, actuator
P0595	Cruise control system, actuator control – circuit low	Wiring short to earth, actuator
P0596	Cruise control system, actuator control – circuit high	Wiring short to positive, actuator
P0597	Thermostat heater control system – circuit open	Wiring, relay, thermostat heater
P0598	Thermostat heater control system – circuit low	Wiring short to earth, relay, thermostat heater
P0599	Thermostat heater control system – circuit high	Wiring short to positive, relay, thermostat heater
P0600	CAN data bus – malfunction	Wiring, connected system, ECM
P0601	Engine control module (ECM) – memory check sum error	ECM
P0602	Engine control module (ECM) – programming error	ECM
P0603	Engine control module (ECM) – KAM error	ECM
P0604	Engine control module (ECM) – RAM error	ECM
P0605	Engine control module (ECM) – ROM error	ECM
P0606	Engine control module (ECM)/powertrain control module (PCM) – processor fault	ECM/PCM
P0607	Control module – performance problem	Control module
P0608	Engine control module (ECM), VSS output A – malfunction	ECM
P0609	Engine control module (ECM), VSS output B – malfunction	ECM
P0610	Control module – vehicle options error	Control module
P0611	Fuel injector control module – performance problem	Fuel injector control module
P0612	Fuel injector control module – control relay circuit	Wiring, relay, fuel injector control module
P0613	Transmission control module (TCM) – processor error	TCM
P0614	Engine control module (ECM)/transmission control module (TCM) – mismatch	ECM/TCM
P0615	Starter motor relay – circuit malfunction	Wiring, poor connection, starter motor relay, ECM
P0616	Starter motor relay – circuit low	Wiring short to earth, starter motor relay, ECM
P0617	Starter motor relay – circuit high	Wiring short to positive, starter motor relay, ECM
P0618	Alternative fuel control module – KAM error	Alternative fuel control module
P0619	Alternative fuel control module – RAM/ROM error	Alternative fuel control module
P0620	Alternator, control – circuit malfunction	Wiring, alternator, battery, ECM
P0621	Alternator warning lamp – circuit malfunction	Wiring, alternator warning lamp, ECM
P0622	Alternator, field control – circuit malfunction	Wiring, alternator, battery, ECM
P0623	Generator control lamp – circuit malfunction	Wiring, poor connection, bulb, ECM
P0624	Filler cap control lamp – circuit malfunction	Wiring, poor connection, bulb, ECM
P0625	Generator field terminal – circuit low	Wiring short to earth, generator
P0626	Generator field terminal – circuit high	Wiring short to positive, generator
P0627	Fuel pump control – circuit open	Wiring, relay, fuel pump
P0628	Fuel pump control – circuit low	Wiring short to earth, relay, fuel pump
P0629	Fuel pump control – circuit high	Wiring short to positive, relay, fuel pump



## EOBD trouble code table

<b>Trouble code</b>	<b>Fault location</b>	<b>Probable cause</b>
P0630	VIN not programmed or mismatch – ECM/PCM	ECM/PCM
P0631	VIN not programmed or mismatch – TCM	TCM
P0632	Odometer not programmed – ECM/PCM	ECM/PCM
P0633	Immobilizer key not programmed – ECM/PCM	ECM/PCM
P0634	PCM/ECM/TCM – internal temperature too high	Mechanical fault, PCM/ECM/TCM
P0635	Power steering control – circuit malfunction	Wiring, poor connection, power steering pressure (PSP) switch, ECM
P0636	Power steering control – circuit low	Wiring short to earth, power steering pressure (PSP) switch, ECM
P0637	Power steering control – circuit high	Wiring short to positive, power steering pressure (PSP) switch, ECM
P0638	Throttle actuator control, bank 1 – range/performance problem	Basic setting not carried out (if applicable), ISC actuator/throttle motor, APP sensor
P0639	Throttle actuator control, bank 2 – range/performance	Wiring, throttle control unit
P0640	Intake air heater control – circuit malfunction	Wiring, relay, intake air heater
P0641	Sensor reference voltage A – circuit open	Wiring short to positive
P0642	Engine control module (ECM), knock control – defective	ECM
P0643	Sensor reference voltage A – circuit high	Wiring short to positive
P0644	Driver display, serial communication – circuit malfunction	Wiring, CAN data bus, ECM
P0645	Air conditioning (AC)	Wiring, AC system
P0646	AC compressor clutch relay – circuit low	Wiring short to earth, AC compressor clutch relay
P0647	AC compressor clutch relay – circuit high	Wiring short to positive, AC compressor clutch relay
P0648	Immobilizer control lamp – circuit malfunction	Wiring, poor connection, bulb, ECM
P0649	Cruise control lamp – circuit	Wiring, poor connection, bulb, ECM
P0650	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, MIL, ECM
P0651	Sensor reference voltage B – circuit open	Wiring short to positive
P0652	Sensor reference voltage B – circuit low	Wiring short to earth
P0653	Sensor reference voltage B – circuit high	Wiring short to positive
P0654	Engine rpm, output – circuit malfunction	Wiring, ECM
P0655	Engine hot lamp output – circuit malfunction	Wiring, engine hot lamp, ECM
P0656	Fuel level output – circuit malfunction	Wiring, ECM
P0657	Actuator supply voltage – circuit open	Wiring
P0658	Actuator supply voltage – circuit low	Wiring short to earth, actuator
P0659	Actuator supply voltage – circuit high	Wiring short to positive, actuator
P0660	Intake manifold air control solenoid, bank 1 – circuit open	Wiring, intake manifold air control solenoid
P0661	Intake manifold air control solenoid, bank 1 – circuit low	Wiring short to earth, intake manifold air control solenoid
P0662	Intake manifold air control solenoid, bank 1 – circuit high	Wiring short to positive, intake manifold air control solenoid
P0663	Intake manifold air control solenoid, bank 2 – circuit open	Wiring, intake manifold air control solenoid
P0664	Intake manifold air control solenoid, bank 2 – circuit low	Wiring short to earth, intake manifold air control solenoid
P0665	Intake manifold air control solenoid, bank 2 – circuit high	Wiring short to positive, intake manifold
P0666	PCM/ECM/TCM internal temperature sensor – circuit malfunction	Wiring, poor connection, internal temperature sensor, ECM
P0667	PCM/ECM/TCM internal temperature sensor – range/performance	Wiring, poor connection, internal temperature sensor, ECM

## EOBD trouble code table

Trouble code	Fault location	Probable cause
P0668	PCM/ECM/TCM internal temperature sensor – circuit low	Wiring short to earth, internal temperature sensor, ECM
P0669	PCM/ECM/TCM internal temperature sensor – circuit high	Wiring short to positive, internal temperature sensor, ECM
P0670	Glow plug control module – circuit malfunction	Wiring, poor connection, glow plug control module, glow plug, ECM
P0671	Glow plug, cylinder 1 – circuit malfunction	Wiring, poor connection, relay, glow plug control module, glow plug, ECM
P0672	Glow plug, cylinder 2 – circuit malfunction	Wiring, poor connection, relay, glow plug control module, glow plug, ECM
P0673	Glow plug, cylinder 3 – circuit malfunction	Wiring, poor connection, relay, glow plug control module, glow plug, ECM
P0674	Glow plug, cylinder 4 – circuit malfunction	Wiring, poor connection, relay, glow plug control module, glow plug, ECM
P0675	Glow plug, cylinder 5 – circuit malfunction	Wiring, poor connection, relay, glow plug control module, glow plug, ECM
P0676	Glow plug, cylinder 6 – circuit malfunction	Wiring, poor connection, relay, glow plug control module, glow plug, ECM
P0677	Glow plug, cylinder 7 – circuit malfunction	Wiring, poor connection, relay, glow plug control module, glow plug, ECM
P0678	Glow plug, cylinder 8 – circuit malfunction	Wiring, poor connection, relay, glow plug control module, glow plug, ECM
P0679	Glow plug, cylinder 9 – circuit malfunction	Wiring, poor connection, relay, glow plug control module, glow plug, ECM
P0680	Glow plug, cylinder 10 – circuit malfunction	Wiring, poor connection, relay, glow plug control module, glow plug, ECM
P0681	Glow plug, cylinder 11 – circuit malfunction	Wiring, poor connection, relay, glow plug control module, glow plug, ECM
P0682	Glow plug, cylinder 12 – circuit malfunction	Wiring, poor connection, relay, glow plug control module, glow plug, ECM
P0683	Glow plug control module/ECM/PCM communication – malfunction	Wiring, poor connection, glow plug control module, ECM/PCM
P0684	Glow plug control module/ECM/PCM communication – range/performance	Wiring, poor connection, glow plug control module, ECM/PCM
P0685	ECM/PCM power relay – circuit open	Wiring, ECM/PCM power relay
P0686	ECM/PCM power relay – circuit low	Wiring short to earth, ECM/PCM power relay, ECM
P0687	Engine control relay – short to earth	Wiring short to earth, engine control relay, ECM
P0688	Engine control relay – short to positive	Wiring short to positive, engine control relay, ECM
P0689	ECM/PCM power relay – sense circuit low	Wiring short to earth, ECM/PCM power relay, ECM
P0690	ECM/PCM power relay – sense circuit high	Wiring short to positive, ECM/PCM power relay, ECM
P0691	Engine coolant blower motor 1 – short to earth	Wiring short to earth, engine coolant blower motor, ECM
P0692	Engine coolant blower motor 1 – short to positive	Wiring short to positive, engine coolant blower motor, ECM
P0693	Engine coolant blower motor 2 – short to earth	Wiring short to earth, engine coolant blower motor, ECM
P0694	Engine coolant blower motor 2 – short to positive	Wiring short to positive, engine coolant blower motor, ECM
P0695	Engine coolant blower motor 3 – control circuit low	Wiring short to earth, blower motor
P0696	Engine coolant blower motor 3 – control circuit high	Wiring short to positive, blower motor
P0697	Sensor reference voltage C – circuit open	Wiring short to positive
P0698	Sensor reference voltage C – circuit low	Wiring short to earth
P0699	Sensor reference voltage C – circuit high	Wiring short to positive

## EOBD trouble code table

<b>Trouble code</b>	<b>Fault location</b>	<b>Probable cause</b>
P0700	Transmission control system – malfunction	Wiring, ECM/PCM/TCM
P0701	Transmission control system – range/performance problem	Wiring, ECM/PCM/TCM
P0702	Transmission control system – electrical	Wiring, ECM/PCM/TCM
P0703	Torque converter/brake switch B – circuit malfunction	Wiring, torque converter/brake switch, ECM/PCM/TCM
P0704	Clutch pedal position (CPP) switch – circuit malfunction	Wiring, CPP switch, ECM/PCM/TCM
P0705	Transmission range (TR) sensor/switch, PRNDL input – circuit malfunction	Wiring, TR sensor/switch, ECM/PCM/TCM
P0706	Transmission range (TR) sensor/switch – range/performance problem	Wiring, TR sensor/switch
P0707	Transmission range (TR) sensor/switch – low input	Wiring short to earth, TR sensor/switch, ECM/PCM/TCM
P0708	Transmission range (TR) sensor/switch – high input	Wiring short to positive, TR sensor/switch, ECM/PCM/TCM
P0709	Transmission range (TR) sensor/switch – circuit intermittent	Wiring, poor connection, TR sensor/switch, ECM/PCM/TCM
P0710	Transmission fluid temperature (TFT) sensor – circuit malfunction	Wiring, TFT sensor, ECM, ECM/PCM/TCM
P0711	Transmission fluid temperature (TFT) sensor – range/performance problem	Wiring, TFT sensor
P0712	Transmission fluid temperature (TFT) sensor – low input	Wiring short to earth, TFT sensor, ECM/PCM/TCM
P0713	Transmission fluid temperature (TFT) sensor – high input	Wiring short to positive, TFT sensor, ECM/PCM/TCM
P0714	Transmission fluid temperature (TFT) sensor – circuit intermittent	Wiring, poor connection, TFT sensor, ECM/PCM/TCM
P0715	Turbine shaft speed (TSS) sensor – circuit malfunction	Wiring, TSS sensor, ECM/PCM/TCM
P0716	Turbine shaft speed (TSS) sensor – range/performance problem	Wiring, TSS sensor
P0717	Turbine shaft speed (TSS) sensor – no signal	Wiring, TSS sensor, ECM/PCM/TCM
P0718	Turbine shaft speed (TSS) sensor – circuit intermittent	Wiring, poor connection, TSS sensor, ECM/PCM/TCM
P0719	Torque converter/brake switch B – circuit low	Wiring short to earth, torque converter/brake switch, ECM/PCM/TCM
P0720	Output shaft speed (OSS) sensor – circuit malfunction	Wiring, VSS, ECM/PCM/TCM
P0721	Output shaft speed (OSS) sensor – range/performance problem	Wiring, VSS
P0722	Output shaft speed (OSS) sensor – no signal	Wiring, VSS, ECM/PCM/TCM
P0723	Output shaft speed (OSS) sensor – circuit intermittent	Wiring, poor connection, VSS, ECM/PCM/TCM
P0724	Torque converter/brake switch B – circuit high	Wiring short to positive, torque converter/brake switch, ECM/PCM/TCM
P0725	Engine RPM input – circuit malfunction	Wiring, CKP/RPM sensor, ECM/PCM/TCM
P0726	Engine RPM input – range/performance problem	Wiring, CKP/RPM sensor
P0727	Engine RPM input – no signal	Wiring, CKP/RPM sensor, ECM/PCM/TCM
P0728	Engine RPM input – circuit intermittent	Wiring, poor connection, CKP/RPM sensor, ECM/PCM/TCM
P0729	Gear 6 – incorrect ratio	Wiring, TR sensor/switch, shift solenoids, transmission mechanical fault
P0730	Incorrect gear ratio	Wiring, TR sensor/switch, shift solenoids, transmission mechanical fault
P0731	Gear 1 – incorrect ratio	Wiring, TR sensor/switch, shift solenoids, transmission mechanical fault
P0732	Gear 2 – incorrect ratio	Wiring, TR sensor/switch, shift solenoids, transmission mechanical fault

# EOBD trouble code table

Trouble code	Fault location	Probable cause
P0733	Gear 3 – incorrect ratio	Wiring, TR sensor/switch, shift solenoids, transmission mechanical fault
P0734	Gear 4 – incorrect ratio	Wiring, TR sensor/switch, shift solenoids, transmission mechanical fault
P0735	Gear 5 – incorrect ratio	Wiring, TR sensor/switch, shift solenoids, transmission mechanical fault
P0736	Reverse – incorrect ratio	Wiring, TR sensor/switch, shift solenoids, transmission mechanical fault
P0737	TCM engine speed – output circuit	Wiring, TCM
P0738	TCM engine speed – output circuit low	Wiring, TCM
P0739	TCM engine speed – output circuit high	Wiring, TCM
P0740	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid, ECM/PCM/TCM
P0741	Torque converter clutch (TCC) solenoid – performance or stuck off	Wiring, TCC solenoid
P0742	Torque converter clutch (TCC) solenoid – stuck on	Wiring, TCC solenoid
P0743	Torque converter clutch (TCC) solenoid – electrical	Wiring, TCC solenoid, ECM/PCM/TCM
P0744	Torque converter clutch (TCC) solenoid – circuit intermittent	Wiring, poor connection, TCC solenoid, ECM/PCM/TCM
P0745	Transmission fluid pressure (TFP) solenoid – circuit malfunction	Wiring, TFP solenoid, ECM/PCM/TCM
P0746	Transmission fluid pressure (TFP) solenoid – performance or stuck off	Wiring, TFP solenoid
P0747	Transmission fluid pressure (TFP) solenoid – stuck on	Wiring, TFP solenoid
P0748	Transmission fluid pressure (TFP) solenoid – electrical	Wiring, TFP solenoid, ECM/PCM/TCM
P0749	Transmission fluid pressure (TFP) solenoid – circuit intermittent	Wiring, poor connection, TFP solenoid, ECM/PCM/TCM
P0750	Shift solenoid (SS) A – circuit malfunction	Wiring, shift solenoid, ECM/PCM/TCM
P0751	Shift solenoid (SS) A – performance or stuck off	Wiring, shift solenoid
P0752	Shift solenoid (SS) A – stuck on	Wiring, shift solenoid
P0753	Shift solenoid (SS) A – electrical	Wiring, shift solenoid, ECM/PCM/TCM
P0754	Shift solenoid (SS) A – circuit intermittent	Wiring, poor connection, shift solenoid, ECM/PCM/TCM
P0755	Shift solenoid (SS) B – circuit malfunction	Wiring, shift solenoid, ECM/PCM/TCM
P0756	Shift solenoid (SS) B – performance or stuck off	Wiring, shift solenoid
P0757	Shift solenoid (SS) B – stuck on	Wiring, shift solenoid
P0758	Shift solenoid (SS) B – electrical	Wiring, shift solenoid, ECM/PCM/TCM
P0759	Shift solenoid (SS) B – circuit intermittent	Wiring, poor connection, shift solenoid, ECM/PCM/TCM
P0760	Shift solenoid (SS) C – circuit malfunction	Wiring, shift solenoid, ECM/PCM/TCM
P0761	Shift solenoid (SS) C – performance or stuck off	Wiring, shift solenoid
P0762	Shift solenoid (SS) C – stuck on	Wiring, shift solenoid
P0763	Shift solenoid (SS) C – electrical	Wiring, shift solenoid, ECM/PCM/TCM
P0764	Shift solenoid (SS) C – circuit intermittent	Wiring, poor connection, shift solenoid, ECM/PCM/TCM
P0765	Shift solenoid (SS) D – circuit malfunction	Wiring, shift solenoid, ECM/PCM/TCM
P0766	Shift solenoid (SS) D – performance or stuck off	Wiring, shift solenoid
P0767	Shift solenoid (SS) D – stuck on	Wiring, shift solenoid
P0768	Shift solenoid (SS) D – electrical	Wiring, shift solenoid, ECM/PCM/TCM

## EOBD trouble code table

<b>Trouble code</b>	<b>Fault location</b>	<b>Probable cause</b>
P0769	Shift solenoid (SS) D – circuit intermittent	Wiring, poor connection, shift solenoid, ECM/PCM/TCM
P0770	Shift solenoid (SS) E – circuit malfunction	Wiring, shift solenoid, ECM/PCM/TCM
P0771	Shift solenoid (SS) E – performance or stuck off	Wiring, shift solenoid
P0772	Shift solenoid (SS) E – stuck on	Wiring, shift solenoid
P0773	Shift solenoid (SS) E – electrical	Wiring, shift solenoid, ECM/PCM/TCM
P0774	Shift solenoid (SS) E – circuit intermittent	Wiring, poor connection, shift solenoid, ECM/PCM/TCM
P0775	Pressure control solenoid B – malfunction	Pressure control solenoid
P0776	Pressure control solenoid B – performance or stuck off	Wiring, pressure control solenoid
P0777	Pressure control solenoid B – stuck on	Wiring, pressure control solenoid
P0778	Pressure control solenoid B – electrical malfunction	Wiring, pressure control solenoid
P0779	Pressure control solenoid B – circuit intermittent	Wiring, poor connection, pressure control solenoid
P0780	Gear selection – shift malfunction	Wiring, TR sensor, shift solenoids, transmission mechanical fault
P0781	Gear selection, 1-2 – shift malfunction	Wiring, TR sensor, shift solenoids, transmission mechanical fault
P0782	Gear selection, 2-3 – shift malfunction	Wiring, TR sensor, shift solenoids, transmission mechanical fault
P0783	Gear selection, 3-4 – shift malfunction	Wiring, TR sensor, shift solenoids, transmission mechanical fault
P0784	Gear selection, 4-5 – shift malfunction	Wiring, TR sensor, shift solenoids, transmission mechanical fault
P0785	Shift/timing solenoid – circuit malfunction	Wiring, shift/timing solenoid, ECM/PCM/TCM
P0786	Shift/timing solenoid – range/performance problem	Wiring, shift/timing solenoid
P0787	Shift/timing solenoid – low	Wiring short to earth, shift/timing solenoid, ECM/PCM/TCM
P0788	Shift/timing solenoid – high	Wiring short to positive, shift/timing solenoid, ECM/PCM/TCM
P0789	Shift/timing solenoid – intermittent	Wiring, poor connection, shift/timing solenoid, ECM/PCM/TCM
P0790	Transmission mode selection switch – circuit malfunction	Wiring, transmission mode selection switch, ECM/PCM/TCM
P0791	Intermediate shaft speed sensor – circuit malfunction	Wiring, poor connection, intermediate shaft speed sensor, ECM/PCM/TCM
P0792	Intermediate shaft speed sensor – range/performance problem	Wiring, poor connection, intermediate shaft speed sensor, ECM/PCM/TCM
P0793	Intermediate shaft speed sensor – no signal	Wiring, poor connection, short to earth, intermediate shaft speed sensor, ECM/PCM/TCM
P0794	Intermediate shaft speed sensor – intermittent circuit malfunction	Wiring, poor connection, intermediate shaft speed sensor, ECM/PCM/TCM
P0795	Transmission fluid pressure (TFP) solenoid C – circuit malfunction	Wiring, poor connection, TFP solenoid, ECM/PCM/TCM
P0796	Transmission fluid pressure (TFP) solenoid C – performance or stuck off	Wiring, poor connection, TFP solenoid, ECM/PCM/TCM
P0797	Transmission fluid pressure (TFP) solenoid C – stuck on	Wiring, poor connection, TFP solenoid, ECM/PCM/TCM
P0798	Transmission fluid pressure (TFP) solenoid C – electrical malfunction	Wiring, poor connection, TFP solenoid, ECM/PCM/TCM
P0799	Transmission fluid pressure (TFP) solenoid C – intermittent circuit malfunction	Wiring, poor connection, ECM/PCM/TCM
P0800	Transfer box control system, MIL request – malfunction	Wiring, mechanical fault

## EOBD trouble code table

Trouble code	Fault location	Probable cause
P0801	Reverse inhibit circuit – malfunction	Wiring, poor connection
P0802	Transmission control system, MIL request – circuit open	Wiring, mechanical fault
P0803	1-4 Upshift (Skip shift) solenoid – circuit malfunction	Wiring, poor connection, upshift solenoid
P0804	1-4 Upshift (Skip shift) warning lamp – circuit malfunction	Wiring, poor connection
P0805	Clutch position sensor – circuit malfunction	Wiring, poor connection, clutch position sensor, ECM/PCM/TCM
P0806	Clutch position sensor – range/performance problem	Wiring, poor connection, clutch position sensor, ECM/PCM/TCM
P0807	Clutch position sensor – low input	Wiring, short to earth, clutch position sensor, ECM/PCM/TCM
P0808	Clutch position sensor – high input	Wiring, short to positive, clutch position sensor, ECM/PCM/TCM
P0809	Clutch position sensor – intermittent circuit malfunction	Wiring, poor connection, clutch position sensor, ECM/PCM/TCM
P0810	Clutch position control error	Wiring, poor connection, ECM/PCM/TCM
P0811	Excessive clutch slip	Wiring, poor connection, mechanical fault, ECM/PCM/TCM
P0812	Reverse gear – input circuit malfunction	Wiring, poor connection, ECM/PCM/TCM
P0813	Reverse gear – output circuit malfunction	Wiring, poor connection, ECM/PCM/TCM
P0814	Transmission range (TR) display – circuit malfunction	Wiring, poor connection, TR sensor, ECM/PCM/TCM
P0815	Upshift switch – circuit malfunction	Wiring, poor connection, upshift switch, ECM/PCM/TCM
P0816	Downshift switch – circuit malfunction	Wiring, poor connection, downshift switch, ECM/PCM/TCM
P0817	Starter disable circuit – malfunction	Wiring, poor connection, ECM/PCM/TCM
P0818	Driveline disconnect switch – circuit malfunction	Wiring, poor connection, upshift switch, ECM/PCM/TCM
P0819	Up/down shift switch to transmission range correlation	Wiring, poor connection, TR sensor, ECM/PCM/TCM
P0820	Gear lever X-Y position sensor – circuit malfunction	Wiring, poor connection, gear lever position sensor, ECM/PCM/TCM
P0821	Gear lever X position sensor – circuit malfunction	Wiring, poor connection, gear lever position sensor, ECM/PCM/TCM
P0822	Gear lever Y position sensor – circuit malfunction	Wiring, poor connection, gear lever position sensor, ECM/PCM/TCM
P0823	Gear lever X position sensor – circuit intermittent	Wiring, poor connection, gear lever position sensor, ECM/PCM/TCM
P0824	Gear lever Y position sensor – circuit intermittent	Wiring, poor connection, gear lever position sensor, ECM/PCM/TCM
P0825	Gear lever push-pull switch – circuit malfunction	Wiring, poor connection, gear lever push-pull switch, ECM/PCM/TCM
P0826	Up/down shift switch – input circuit	Wiring, up/down shift switch
P0827	Up/down shift switch – input circuit low	Wiring short to earth, up/down shift switch
P0828	Up/down shift switch – input circuit high	Wiring short to positive, up/down shift switch
P0829	5-6 Upshift	Mechanical fault
P0830	Clutch pedal position (CPP) switch A – circuit malfunction	Wiring, poor connection, CPP switch, ECM/PCM/TCM
P0831	Clutch pedal position (CPP) switch A – low input	Wiring, short to earth, CPP switch, ECM/PCM/TCM
P0832	Clutch pedal position (CPP) switch A – high input	Wiring, short to positive, CPP switch, ECM/PCM/TCM
P0833	Clutch pedal position (CPP) switch B – circuit malfunction	Wiring, poor connection, CPP switch, ECM/PCM/TCM
P0834	Clutch pedal position (CPP) switch B – low input	Wiring, short to earth, CPP switch, ECM/PCM/TCM
P0835	Clutch pedal position (CPP) switch B – high input	Wiring, short to positive, CPP switch, ECM/PCM/TCM

## EOBD trouble code table

Trouble code	Fault location	Probable cause
P0836	Four wheel drive switch – circuit malfunction	Wiring, poor connection, four wheel drive switch, ECM/PCM/TCM
P0837	Four wheel drive switch – range/performance problem	Wiring, poor connection, four wheel drive switch, ECM/PCM/TCM
P0838	Four wheel drive switch – low input	Wiring, short to earth, four wheel drive switch, ECM/PCM/TCM
P0839	Four wheel drive switch – high input	Wiring, short to positive, four wheel drive switch, ECM/PCM/TCM
P0840	Transmission fluid pressure (TFP) sensor A – circuit malfunction	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0840	Transmission fluid pressure (TFP) switch A – circuit malfunction	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0841	Transmission fluid pressure (TFP) sensor A – range/performance problem	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0841	Transmission fluid pressure (TFP) switch A – range/performance problem	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0842	Transmission fluid pressure (TFP) sensor A – low input	Wiring, short to earth, TFP sensor, ECM/PCM/TCM
P0842	Transmission fluid pressure (TFP) switch A – low input	Wiring, short to earth, TFP switch, ECM/PCM/TCM
P0843	Transmission fluid pressure (TFP) sensor A – high input	Wiring, short to positive, TFP sensor, ECM/PCM/TCM
P0843	Transmission fluid pressure (TFP) switch A – high input	Wiring, short to positive, TFP switch, ECM/PCM/TCM
P0844	Transmission fluid pressure (TFP) sensor A – intermittent circuit malfunction	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0844	Transmission fluid pressure (TFP) switch A – intermittent circuit malfunction	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0845	Transmission fluid pressure (TFP) sensor B – circuit malfunction	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0845	Transmission fluid pressure (TFP) switch B – circuit malfunction	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0846	Transmission fluid pressure (TFP) sensor B – range/performance problem	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0846	Transmission fluid pressure (TFP) switch B – range/performance problem	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0847	Transmission fluid pressure (TFP) sensor B – low input	Wiring, short to earth, TFP sensor, ECM/PCM/TCM
P0847	Transmission fluid pressure (TFP) switch B – low input	Wiring, short to earth, TFP switch, ECM/PCM/TCM
P0848	Transmission fluid pressure (TFP) sensor B – high input	Wiring, short to positive, TFP sensor, ECM/PCM/TCM
P0848	Transmission fluid pressure (TFP) switch B – high input	Wiring, short to positive, TFP switch, ECM/PCM/TCM
P0849	Transmission fluid pressure (TFP) sensor B – intermittent circuit malfunction	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0849	Transmission fluid pressure (TFP) switch B – intermittent circuit malfunction	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0850	Park/neutral position (PNP) switch – input circuit malfunction	Wiring, PNP switch, ECM/PCM/TCM
P0851	Park/neutral position (PNP) switch – input circuit low	Wiring, short to earth, PNP switch, ECM/PCM/TCM
P0852	Park/neutral position (PNP) switch – input circuit high	Wiring, short to positive, PNP switch, ECM/PCM/TCM
P0853	Drive switch – input circuit malfunction	Wiring, drive switch, ECM/PCM/TCM
P0854	Drive switch – input circuit low	Wiring, short to earth, drive switch, ECM/PCM/TCM
P0855	Drive switch – input circuit high	Wiring, short to positive, drive switch, ECM/PCM/TCM
P0856	Traction control input signal – malfunction	Wiring, poor connection, ECM/PCM/TCM
P0857	Traction control input signal – range/performance problem	Wiring, poor connection, ECM/PCM/TCM
P0858	Traction control input signal – low	Wiring, short to earth, ECM/PCM/TCM
P0859	Traction control input signal – high	Wiring, short to positive, ECM/PCM/TCM

# EOBD trouble code table

Trouble code	Fault location	Probable cause
P0860	Gear shift module communication circuit – malfunction	Wiring, poor connection, gear shift module, ECM/PCM/TCM
P0861	Gear shift module communication circuit – low input	Wiring, short to earth, gear shift module, ECM/PCM/TCM
P0862	Gear shift module communication circuit – high input	Wiring, short to positive, gear shift module, ECM/PCM/TCM
P0863	Transmission control module (TCM) communication circuit – malfunction	Wiring, poor connection, TCM
P0864	Transmission control module (TCM) communication circuit – range/performance problem	Wiring, poor connection, TCM
P0865	Transmission control module (TCM) communication circuit – low input	Wiring, short to earth, TCM
P0866	Transmission control module (TCM) communication circuit – high input	Wiring, short to positive, TCM
P0867	Transmission fluid pressure (TFP) sensor	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0868	Transmission fluid pressure (TFP) sensor – low	Wiring, short to earth, TFP sensor, ECM/PCM/TCM
P0869	Transmission fluid pressure (TFP) sensor – high	Wiring, short to positive, TFP sensor, ECM/PCM/TCM
P0870	Transmission fluid pressure (TFP) sensor C – circuit malfunction	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0870	Transmission fluid pressure (TFP) switch C – circuit malfunction	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0871	Transmission fluid pressure (TFP) sensor C – range/performance	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0871	Transmission fluid pressure (TFP) switch C – range/performance	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0872	Transmission fluid pressure (TFP) sensor C – circuit low	Wiring, short to earth, TFP sensor, ECM/PCM/TCM
P0872	Transmission fluid pressure (TFP) switch C – circuit low	Wiring, short to earth, TFP switch, ECM/PCM/TCM
P0873	Transmission fluid pressure (TFP) sensor C – circuit high	Wiring, short to positive, TFP sensor, ECM/PCM/TCM
P0873	Transmission fluid pressure (TFP) switch C – circuit high	Wiring, short to positive, TFP switch, ECM/PCM/TCM
P0874	Transmission fluid pressure (TFP) sensor C – intermittent circuit malfunction	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0874	Transmission fluid pressure (TFP) switch C – intermittent circuit malfunction	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0875	Transmission fluid pressure (TFP) sensor D – circuit malfunction	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0875	Transmission fluid pressure (TFP) switch D – circuit malfunction	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0876	Transmission fluid pressure (TFP) sensor D – range/performance	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0876	Transmission fluid pressure (TFP) switch D – range/performance	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0877	Transmission fluid pressure (TFP) sensor D – circuit low	Wiring, short to earth, TFP sensor, ECM/PCM/TCM
P0877	Transmission fluid pressure (TFP) switch D – circuit low	Wiring, short to earth, TFP switch, ECM/PCM/TCM
P0878	Transmission fluid pressure (TFP) sensor D – circuit high	Wiring, short to positive, TFP sensor, ECM/PCM/TCM
P0878	Transmission fluid pressure (TFP) switch D – circuit high	Wiring, short to positive, TFP switch, ECM/PCM/TCM
P0879	Transmission fluid pressure (TFP) sensor D – intermittent circuit malfunction	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0879	Transmission fluid pressure (TFP) switch D – intermittent circuit malfunction	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0880	Transmission control module (TCM) – power input signal malfunction	Wiring, poor connection, TCM
P0881	Transmission control module (TCM) – power input signal range/performance	Wiring, poor connection, TCM



## EOBD trouble code table

<b>Trouble code</b>	<b>Fault location</b>	<b>Probable cause</b>
P0882	Transmission control module (TCM) – power input signal low	Wiring, short to earth, TCM
P0883	Transmission control module (TCM) – power input signal high	Wiring, short to positive, TCM
P0884	Transmission control module (TCM) – power input signal intermittent malfunction	Wiring, poor connection, TCM
P0885	Transmission control module (TCM) power relay – control circuit open	Wiring, poor connection, TCM power relay, TCM
P0886	Transmission control module (TCM) power relay – control circuit low	Wiring, short to earth, TCM power relay, TCM
P0887	Transmission control module (TCM) power relay – control circuit high	Wiring, short to positive, TCM power relay, TCM
P0888	Transmission control module (TCM) power relay – sense circuit malfunction	Wiring, poor connection, TCM power relay, TCM
P0889	Transmission control module (TCM) power relay – sense circuit range/performance	Wiring, poor connection, TCM power relay, TCM
P0890	Transmission control module (TCM) power relay – sense circuit low	Wiring, short to earth, TCM power relay, TCM
P0891	Transmission control module (TCM) power relay – sense circuit high	Wiring, short to positive, TCM power relay, TCM
P0892	Transmission control module (TCM) power relay – sense circuit intermittent malfunction	Wiring, poor connection, TCM power relay, TCM
P0893	Multiple gears engaged	Mechanical fault
P0894	Transmission component slipping	Mechanical fault
P0895	Shift time too short	Mechanical fault
P0896	Shift time too long	Mechanical fault
P0897	Transmission fluid deteriorated	Mechanical fault
P0898	Transmission control system – MIL request – circuit low	Wiring, poor connection, short to earth
P0899	Transmission control system – MIL request – circuit high	Wiring, poor connection, short to positive
P0900	Clutch actuator – circuit open	Wiring, clutch actuator, ECM/PCM/TCM
P0901	Clutch actuator – circuit range/performance	Wiring, poor connection, clutch actuator, ECM/PCM/TCM
P0902	Clutch actuator – circuit low	Wiring, short to earth, clutch actuator, ECM/PCM/TCM
P0903	Clutch actuator – circuit high	Wiring, short to positive, clutch actuator, ECM/PCM/TCM
P0904	Transmission gate select position circuit – malfunction	Wiring, poor connection, ECM/PCM/TCM
P0905	Transmission gate select position circuit – range/performance	Wiring, poor connection, ECM/PCM/TCM
P0906	Transmission gate select position circuit – low	Wiring, short to earth, ECM/PCM/TCM
P0907	Transmission gate select position circuit – high	Wiring, short to positive, ECM/PCM/TCM
P0908	Transmission gate select position circuit – intermittent circuit malfunction	Wiring, poor connection, ECM/PCM/TCM
P0909	Transmission gate select control error	Mechanical fault
P0910	Transmission gate select actuator – circuit open	Wiring, transmission gate select actuator, ECM/PCM/TCM
P0911	Transmission gate select actuator – circuit range/performance	Wiring, poor connection, transmission gate select actuator, ECM/PCM/TCM
P0912	Transmission gate select actuator – circuit low	Wiring, short to earth, transmission gate select actuator, ECM/PCM/TCM
P0913	Transmission gate select actuator – circuit high	Wiring, short to positive, transmission gate select actuator, ECM/PCM/TCM
P0914	Gear shift position circuit – malfunction	Wiring, poor connection, ECM/PCM/TCM

## EOBD trouble code table

Trouble code	Fault location	Probable cause
P0915	Gear shift position circuit – range/performance	Wiring, poor connection, ECM/PCM/TCM
P0916	Gear shift position circuit – low	Wiring, short to earth, ECM/PCM/TCM
P0917	Gear shift position circuit – high	Wiring, short to positive, ECM/PCM/TCM
P0918	Gear shift position circuit – intermittent malfunction	Wiring, poor connection, ECM/PCM/TCM
P0919	Gear shift position control – error	Wiring, poor connection, ECM/PCM/TCM
P0920	Gear shift forward actuator – circuit open	Wiring, gear shift forward actuator, ECM/PCM/TCM
P0921	Gear shift forward actuator – circuit range/performance	Wiring, poor connection, gear shift forward actuator, ECM/PCM/TCM
P0922	Gear shift forward actuator – circuit low	Wiring, short to earth, gear shift forward actuator, ECM/PCM/TCM
P0923	Gear shift forward actuator – circuit high	Wiring, short to positive, gear shift forward actuator, ECM/PCM/TCM
P0924	Gear shift reverse actuator – circuit open	Wiring, gear shift reverse actuator, ECM/PCM/TCM
P0925	Gear shift reverse actuator – circuit range/performance	Wiring, poor connection, gear shift reverse actuator, ECM/PCM/TCM
P0926	Gear shift reverse actuator – circuit low	Wiring, short to earth, gear shift reverse actuator, ECM/PCM/TCM
P0927	Gear shift reverse actuator – circuit high	Wiring, short to positive, gear shift reverse actuator, ECM/PCM/TCM
P0928	Gear shift lock solenoid – circuit open	Wiring, gear shift lock solenoid, ECM/PCM/TCM
P0929	Gear shift lock solenoid – circuit range/performance	Wiring, gear shift lock solenoid, ECM/PCM/TCM
P0930	Gear shift lock solenoid – circuit low	Wiring, short to earth, gear shift lock solenoid, ECM/PCM/TCM
P0931	Gear shift lock solenoid – circuit high	Wiring, short to positive, gear shift lock solenoid, ECM/PCM/TCM
P0932	Hydraulic pressure sensor – circuit malfunction	Wiring, poor connection, hydraulic pressure sensor, ECM/PCM/TCM
P0933	Hydraulic pressure sensor – range/performance	Wiring, hydraulic pressure sensor, ECM/PCM/TCM
P0934	Hydraulic pressure sensor – circuit low input	Wiring, short to earth, hydraulic pressure sensor, ECM/PCM/TCM
P0935	Hydraulic pressure sensor – circuit high input	Wiring, short to positive, hydraulic pressure sensor, ECM/PCM/TCM
P0936	Hydraulic pressure sensor – circuit intermittent	Wiring, poor connection, hydraulic pressure sensor, ECM/PCM/TCM
P0937	Hydraulic oil temperature sensor – circuit malfunction	Wiring, poor connection, hydraulic oil temperature sensor, ECM/PCM/TCM
P0938	Hydraulic oil temperature sensor – range/performance	Wiring, hydraulic oil temperature sensor, ECM/PCM/TCM
P0939	Hydraulic oil temperature sensor – circuit low input	Wiring, short to earth, hydraulic oil temperature sensor, ECM/PCM/TCM
P0940	Hydraulic oil temperature sensor – circuit high input	Wiring, short to positive, hydraulic oil temperature sensor, ECM/PCM/TCM
P0941	Hydraulic oil temperature sensor – circuit intermittent	Wiring, poor connection, hydraulic oil temperature sensor, ECM/PCM/TCM
P0942	Hydraulic pressure unit	Mechanical fault
P0943	Hydraulic pressure unit – cycling period too short	Mechanical fault
P0944	Hydraulic pressure unit – loss of pressure	Mechanical fault
P0945	Hydraulic pump relay – circuit open	Wiring, hydraulic pump relay, ECM/PCM/TCM
P0946	Hydraulic pump relay – circuit range/performance	Wiring, hydraulic pump relay, ECM/PCM/TCM
P0947	Hydraulic pump relay – circuit low	Wiring, short to earth, hydraulic pump relay, ECM/PCM/TCM

## EOBD trouble code table

Trouble code	Fault location	Probable cause
P0948	Hydraulic pump relay – circuit high	Wiring, short to positive, hydraulic pump relay, ECM/PCM/TCM
P0949	ASM – adaptive learning not done	ECM/PCM/TCM
P0950	ASM control circuit	Wiring, poor connection, ECM/PCM/TCM
P0951	ASM control circuit – range/performance	Wiring, poor connection, ECM/PCM/TCM
P0952	ASM control circuit – low	Wiring, poor connection, short to earth, ECM/PCM/TCM
P0953	ASM control circuit – high	Wiring, poor connection, short to positive, ECM/PCM/TCM
P0954	ASM – intermittent circuit malfunction	Wiring, poor connection, ECM/PCM/TCM
P0955	ASM mode circuit – malfunction	Wiring, poor connection, ECM/PCM/TCM
P0956	ASM mode circuit – range/performance	Wiring, poor connection, ECM/PCM/TCM
P0957	ASM mode circuit – low	Wiring, poor connection, short to earth, ECM/PCM/TCM
P0958	ASM mode circuit – high	Wiring, poor connection, short to positive, ECM/PCM/TCM
P0959	ASM mode circuit – intermittent circuit malfunction	Wiring, poor connection, ECM/PCM/TCM
P0960	Pressure control (PC) solenoid A – control circuit open	Wiring, poor connection, pressure control solenoid, ECM/PCM/TCM
P0961	Pressure control (PC) solenoid A – control circuit range/performance	Wiring, poor connection, pressure control solenoid, ECM/PCM/TCM
P0962	Pressure control (PC) solenoid A – control circuit low	Wiring, short to earth, pressure control solenoid, ECM/PCM/TCM
P0963	Pressure control (PC) solenoid A – control circuit high	Wiring, short to positive, pressure control solenoid, ECM/PCM/TCM
P0964	Pressure control (PC) solenoid B – control circuit open	Wiring, poor connection, pressure control solenoid, ECM/PCM/TCM
P0965	Pressure control (PC) solenoid B – control circuit range/performance	Wiring, poor connection, pressure control solenoid, ECM/PCM/TCM
P0966	Pressure control (PC) solenoid B – control circuit low	Wiring, short to earth, pressure control solenoid, ECM/PCM/TCM
P0967	Pressure control (PC) solenoid B – control circuit high	Wiring, short to positive, pressure control solenoid, ECM/PCM/TCM
P0968	Pressure control (PC) solenoid C – control circuit open	Wiring, poor connection, pressure control solenoid, ECM/PCM/TCM
P0969	Pressure control (PC) solenoid C – control circuit range/performance	Wiring, poor connection, pressure control solenoid, ECM/PCM/TCM
P0970	Pressure control (PC) solenoid C – control circuit low	Wiring, short to earth, pressure control solenoid, ECM/PCM/TCM
P0971	Pressure control (PC) solenoid C – control circuit high	Wiring, short to positive, pressure control solenoid, ECM/PCM/TCM
P0972	Shift solenoid (SS) A – control circuit range/performance	Wiring, poor connection, shift solenoid, ECM/PCM/TCM
P0973	Shift solenoid (SS) A – control circuit low	Wiring, short to earth, shift solenoid, ECM/PCM/TCM
P0974	Shift solenoid (SS) A – control circuit high	Wiring, short to positive, shift solenoid, ECM/PCM/TCM
P0975	Shift solenoid (SS) B – control circuit range/performance	Wiring, poor connection, shift solenoid, ECM/PCM/TCM
P0976	Shift solenoid (SS) B – control circuit low	Wiring, short to earth, shift solenoid, ECM/PCM/TCM
P0977	Shift solenoid (SS) B – control circuit high	Wiring, short to positive, shift solenoid, ECM/PCM/TCM
P0978	Shift solenoid (SS) C – control circuit range/performance	Wiring, poor connection, shift solenoid, ECM/PCM/TCM

# EOBD trouble code table

Trouble code	Fault location	Probable cause
P0979	Shift solenoid (SS) C – control circuit low	Wiring, short to earth, shift solenoid, ECM/PCM/TCM
P0980	Shift solenoid (SS) C – control circuit high	Wiring, short to positive, shift solenoid, ECM/PCM/TCM
P0981	Shift solenoid (SS) D – control circuit range/performance	Wiring, poor connection, shift solenoid, ECM/PCM/TCM
P0982	Shift solenoid (SS) D – control circuit low	Wiring, short to earth, shift solenoid, ECM/PCM/TCM
P0983	Shift solenoid (SS) D – control circuit high	Wiring, short to positive, shift solenoid, ECM/PCM/TCM
P0984	Shift solenoid (SS) E – control circuit range/performance	Wiring, poor connection, shift solenoid, ECM/PCM/TCM
P0985	Shift solenoid (SS) E – control circuit low	Wiring, short to earth, shift solenoid, ECM/PCM/TCM
P0986	Shift solenoid (SS) E – control circuit high	Wiring, short to positive, shift solenoid, ECM/PCM/TCM
P0987	Transmission fluid pressure (TFP) sensor E – circuit malfunction	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0987	Transmission fluid pressure (TFP) switch E – circuit malfunction	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0988	Transmission fluid pressure (TFP) sensor E – circuit range/performance	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0988	Transmission fluid pressure (TFP) switch E – circuit range/performance	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0989	Transmission fluid pressure (TFP) sensor E – circuit low	Wiring, short to earth, TFP sensor, ECM/PCM/TCM
P0989	Transmission fluid pressure (TFP) switch E – circuit low	Wiring, short to earth, TFP switch, ECM/PCM/TCM
P0990	Transmission fluid pressure (TFP) sensor E – circuit high	Wiring, short to positive, TFP sensor, ECM/PCM/TCM
P0990	Transmission fluid pressure (TFP) switch E – circuit high	Wiring, short to positive, TFP switch, ECM/PCM/TCM
P0991	Transmission fluid pressure (TFP) sensor E – circuit intermittent	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0991	Transmission fluid pressure (TFP) switch E – circuit intermittent	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0992	Transmission fluid pressure (TFP) sensor F – circuit malfunction	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0992	Transmission fluid pressure (TFP) switch F – circuit malfunction	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0993	Transmission fluid pressure (TFP) sensor F – circuit range/performance	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0993	Transmission fluid pressure (TFP) switch F – circuit range/performance	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0994	Transmission fluid pressure (TFP) sensor F – circuit low	Wiring, short to earth, TFP sensor, ECM/PCM/TCM
P0994	Transmission fluid pressure (TFP) switch F – circuit low	Wiring, short to earth, TFP switch, ECM/PCM/TCM
P0995	Transmission fluid pressure (TFP) sensor F – circuit high	Wiring, short to positive, TFP sensor, ECM/PCM/TCM
P0995	Transmission fluid pressure (TFP) switch F – circuit high	Wiring, short to positive, TFP switch, ECM/PCM/TCM
P0996	Transmission fluid pressure (TFP) sensor F – circuit intermittent	Wiring, poor connection, TFP sensor, ECM/PCM/TCM
P0996	Transmission fluid pressure (TFP) switch F – circuit intermittent	Wiring, poor connection, TFP switch, ECM/PCM/TCM
P0997	Shift solenoid (SS) F – control circuit range/performance	Wiring, poor connection, shift solenoid, ECM/PCM/TCM
P0998	Shift solenoid (SS) F – control circuit low	Wiring short to earth, shift solenoid, ECM/PCM/TCM
P0999	Shift solenoid (SS) F – control circuit high	Wiring short to positive, shift solenoid, ECM/PCM/TCM



Model: 145/146 1,4/1,6/1,8/2,0 • 145/146 1,7  
156 1,6/1,8/2,0 (MT) • 166 2,0 • Spider/GTV 1,8  
Spider/GTV 2,0

Year: 1994-00

Engine code: 162.01/32, 322.01, 323.01, 334.01, 335.03, 341.03,  
671.06, 672.04, 676.01

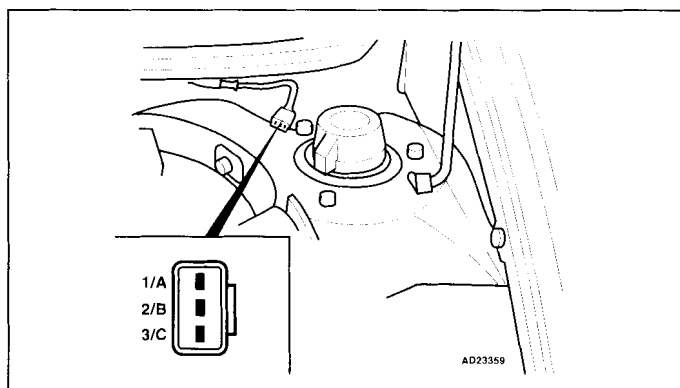
System: Bosch Motronic M 1.5.5  
Bosch Motronic M 2.10.3/4

**ALFA ROMEO**

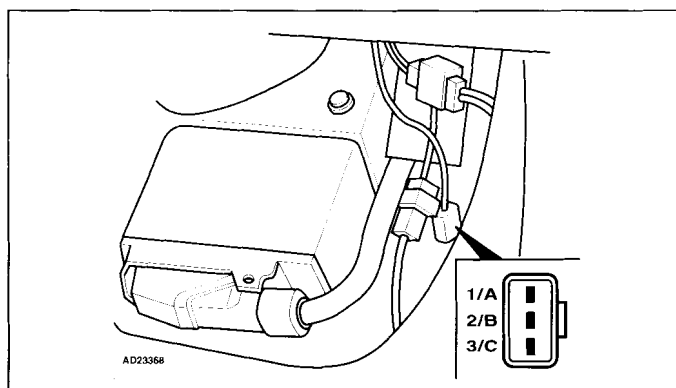


Engine management

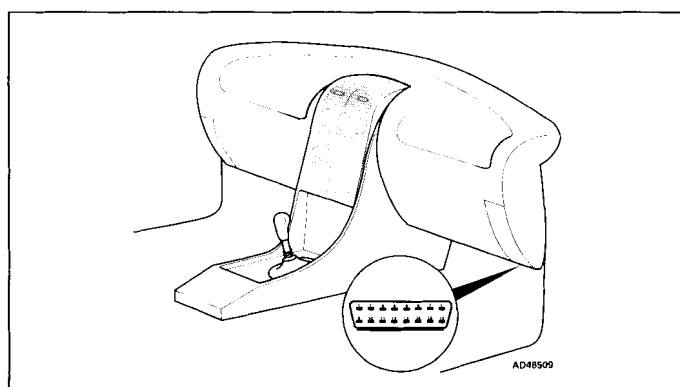
## Data link connector (DLC) locations



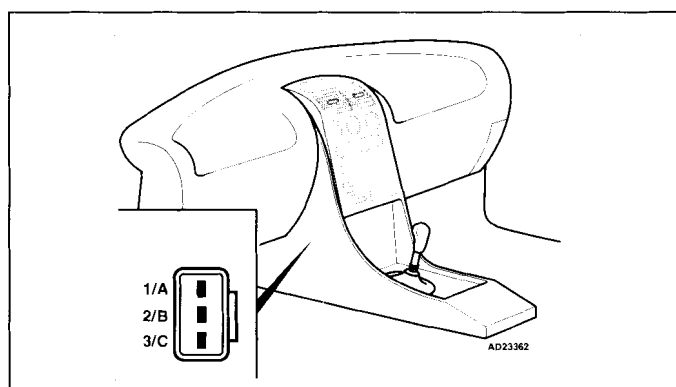
145/146 type 1, 3-pin – LH engine bay



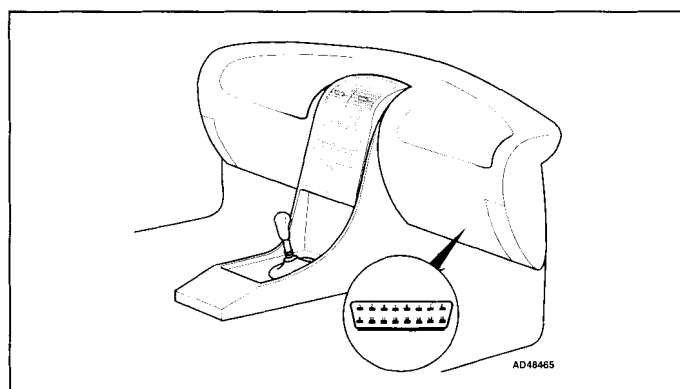
145/146 type 2, 3-pin – LH footwell, under cover



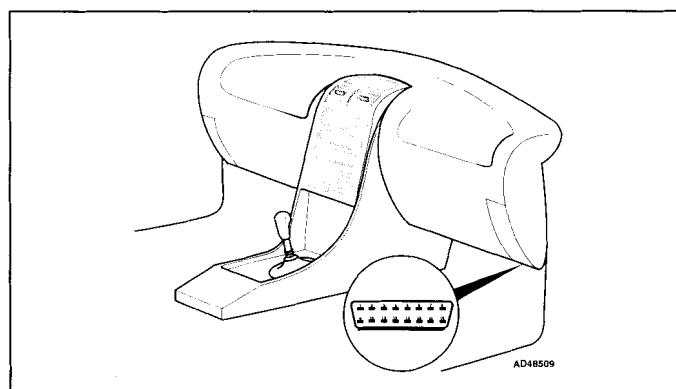
145/146 type 3, 16-pin – under fascia, driver's side



Spider/GTV →1997 – under centre console, passenger's side



156/166 – under fascia, driver's side



Spider/GTV 1998→ – under fascia, driver's side



### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- No digital trouble codes available from vehicle manufacturer.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

#### Trouble code identification

Fault location	Probable cause
AC signal	Wiring, AC system, AC control module
Air conditioning relay – circuit malfunction	Wiring, supply voltage, AC system
Camshaft position (CMP) actuator – circuit malfunction	Wiring, CMP actuator relay, CMP actuator, ECM
Camshaft position (CMP) sensor – circuit malfunction	Wiring, CMP sensor, ECM
Crankshaft position (CKP) sensor/engine speed (RPM) sensor – malfunction	Wiring, air gap, CKP/RPM sensor, mechanical fault, ECM
Engine control module (ECM) – defective	ECM
Engine control relay	Wiring, supply voltage, engine control relay
Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring, supply voltage, EVAP canister purge valve, ECM
Exhaust gas recirculation (EGR) solenoid	Wiring, supply voltage, EGR solenoid, ECM
Fuel pump relay	Wiring, supply voltage, fuel pump relay
Heated oxygen sensor (HO2S)	Wiring, HO2S, air leak, ECM
Idle air control (IAC) valve	Wiring, IAC valve, ECM
Idle speed control (ISC) actuator/throttle motor	Wiring, ISC actuator/throttle motor, mechanical fault, ECM
Idle control – outside specification	Intake leak/blockage, throttle valve tight/sticking, IAC valve or ISC actuator, ECM
Ignition coils	Wiring, supply voltage, ignition coil, ECM
Ignition switch – circuit malfunction	Wiring, supply voltage, ignition switch
Immobilizer circuit – malfunction	Wiring, immobilizer defective, ECM
Injector 1	Wiring, fuse, engine control relay, injector
Injector 2	Wiring, fuse, engine control relay, injector
Injector 3	Wiring, fuse, engine control relay, injector
Injector 4	Wiring, fuse, engine control relay, injector
■ Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
Intake manifold air control solenoid – circuit malfunction	Wiring, intake manifold air control solenoid, ECM
Knock sensor (KS)	Wiring, KS, KS incorrectly tightened, ECM

Model: 145/146 1,4/1,6/1,8/2,0 • 145/146 1,7 • 156 1,6/1,8/2,0 (MT)  
166 2,0 • Spider/GTV 1,8 • Spider/GTV 2,0

**ALFA ROMEO**



## Engine management

Fault location	Probable cause
Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, supply voltage, MIL lamp
Mass air flow (MAF) sensor	Wiring, intake leak, air filter blocked, MAF sensor, ECM
Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, MAP/MAF sensor, HO2S, EVAP canister purge valve, injector(s), excessive fuel in engine oil
Mixture control (MC) – rich	Wiring, injector, fuel pressure, MAF sensor, ECM
Mixture control (MC) – weak	Wiring, air leak, fuel pressure, ignition system, injector, MAF sensor, HO2S, ECM
Supply voltage	Wiring, fuses, battery, alternator, ignition switch
<b>2</b> Throttle position (TP) sensor	Wiring, TP sensor, ECM
Vehicle speed signal	Wiring, VSS, ECM

**1** M 1.5.5: Located in mass air flow (MAF) sensor.

**2** M 1.5.5: Located in idle speed control (ISC) actuator/throttle motor.





# AUDI

**Model:** A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93 →) • A4/S4 • 100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI A6/S6/Allroad • A8/S8 • Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

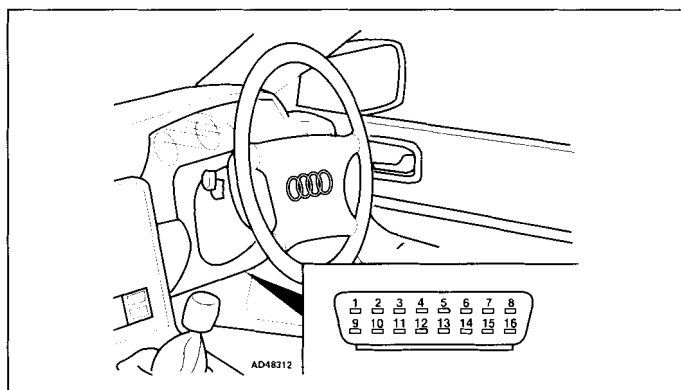
**Year:** 1991-04

**Engine code:** 1Z, AAH, AAT, ABC, ABK, ABZ, ACK, ACZ, ADA, ADP, ADR, AEB, AEC, AEH, AEL, AEW, AFB, AFF, AFN, AFY, AGA, AGB, AGN, AGR, AGU, AHC, AHF, AHH, AHK, AHL, AHU, AJG, AJK, AJL, AJM, AJP, AJQ, AKC, AKE, AKG, AKF, AKH, AKJ, AKL, AKN, ALF, ALG, ALH, ALT, ALW, ALZ, AMF, AMK, AML, AMM, AMU, AMX, ANA, ANB, ANK, ANP, ANY, APB, APF, APG, APP, APR, APS, APT, APU, APX, APY, APZ, AQA, AQD, AQE, AQF, AQG, AQH, AQJ, ARE, ARG, ARH, ARJ, ARM, ARS, ARU, ARX, ARY, ARZ, ASG, ASJ, ASM, ASN, ASV, ATD, ATJ, AUA, AUM, AUQ, AVB, AVF, AVG, AVJ, AVN, AVU, AVV, AWN, AWT, AWX, AXR, AYM, AZA, AZC, AZR, BAD, BAM, BAU, BBD, BBJ, BBY, BCZ, BDG, BDH, BDV, BFC, BFQ, BHE

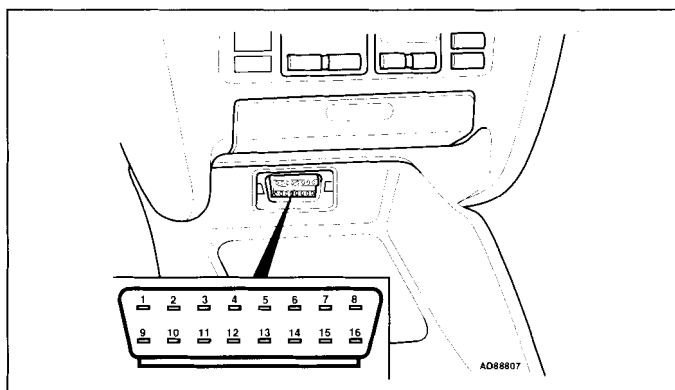
**System:** Bosch EDC/1.3.1/2/3/1.4 • Bosch EDC 15M/P/V • Bosch Motronic • Bosch Motronic M2.4.1  
Bosch Motronic M3.2/3.2.1 • Bosch Motronic M3.8.2/3/4 • Bosch Motronic M5.4/1  
Bosch Motronic ME7.0/7.1/7.5/7.5.10 • Bosch MSA 12/15.5 • Siemens Simos • VAG Digifant ML5.7  
VAG MPI

## Engine management

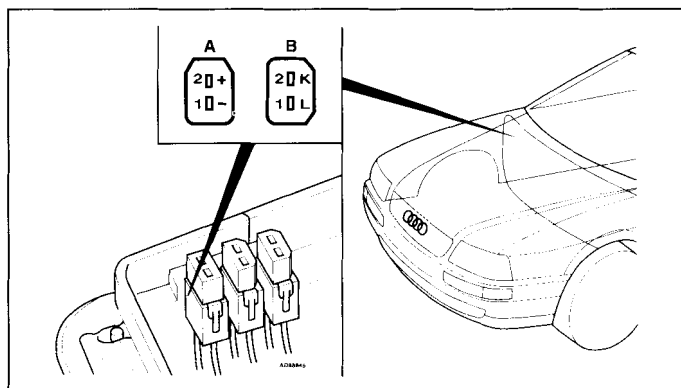
### Data link connector (DLC) locations



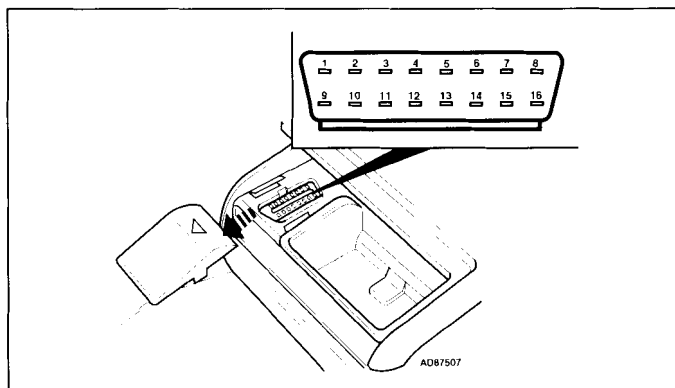
A2, A4/S4 2000→, A6/S6/Allroad 1997→ – fascia, driver's side



A3/S3 – centre console



80, Coupé, Cabriolet – in underbonnet fusebox/relay plate



A4/S4 1994-00 – centre console, rear

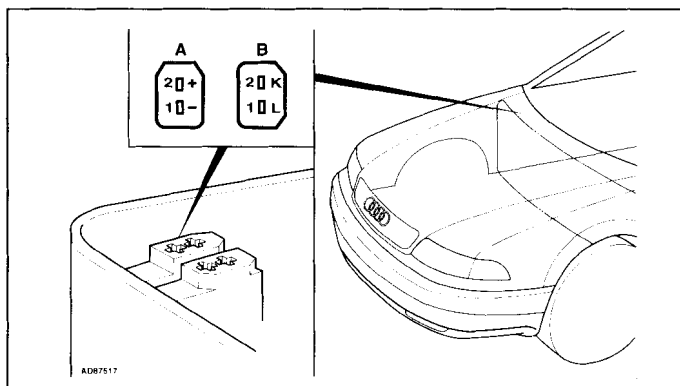


Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93 →) • A4/S4  
 100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
 Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

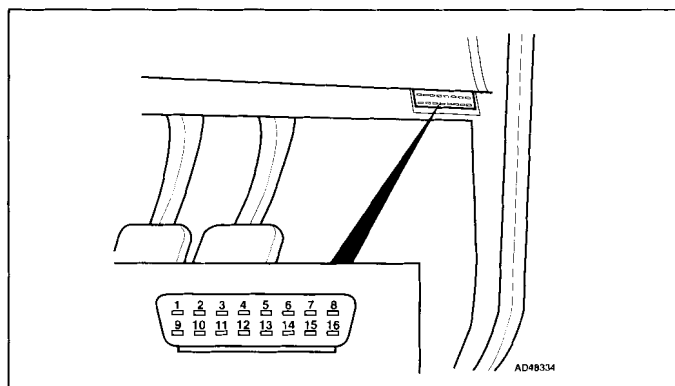
**AUDI**



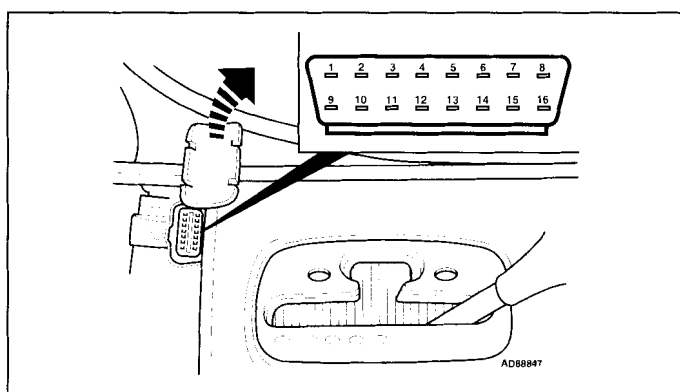
## Engine management



100/A6/S6 →1997 – in underbonnet relay plate



TT – fascia, driver's side



A8/S8 – under front ashtray

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Carry out road test for at least 10 minutes.
- Automatic transmission in 'P' or 'N'.
- If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**NOTE:** *Self-diagnosis output using 4-digit trouble codes may not display all available diagnostic information (early models).*

**AUDI**

Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93 →) • A4/S4  
 100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
 Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**Engine management****Trouble code identification**

VAG type 4-digit	Fault location	Probable cause
1111	Engine control module (ECM) – defective	ECM
1231	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
1232	Idle speed control (ISC) actuator	Throttle valve tight/sticking, wiring, multi-plug incorrectly wired, ISC actuator
2111	Crankshaft position (CKP) sensor	Air gap, metal particles, insecure sensor/rotor, wiring, CKP sensor
2113	Camshaft position (CMP) sensor	Air gap, insecure sensor/rotor, wiring, poor connection, fuse, distributor/camshaft alignment, CMP sensor
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
2141	Knock control – control limit exceeded	ECM
2142	Knock sensor (KS) 1	Wiring, KS, ECM
2144	Knock sensor (KS) 2	Wiring, KS, ECM
2212	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
2214	Maximum engine RPM exceeded	Incorrect gear shift, CKP/RPM sensor
2222	Manifold absolute pressure (MAP) sensor	TC wastegate regulating valve, hose connection(s), oil contamination, valve timing, poor connection, wiring, MAP sensor, ECM
2231	Idle speed control (ISC)	Intake leak/blockage, throttle valve tight/sticking, IAC valve or ISC actuator/position sensor
2234	Engine control module (ECM) – supply voltage	Fuse, alternator, battery, current draw with ignition OFF, engine control relay, wiring
2242	Mixture adjustment resistor	Wiring, mixture adjustment resistor
2243	Instrument panel, fuel consumption signal	Wiring short to positive, instrument panel
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2314	Engine/gearbox electrical connection	Wiring, transmission fault
2322	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
2323	Volume air flow (VAF) sensor	Intake leak, wiring, VAF sensor
2324	Mass air flow (MAF) sensor	Intake leak, wiring, MAF sensor
2341	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, intake/exhaust leak, misfire, fuel level low, fuel pressure/pump, injector(s), EVAP canister purge valve, MAF sensor filament burn-off, wiring, HO2S
2342	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
2411	Exhaust gas recirculation temperature (EGRT) sensor	Wiring, EGRT sensor
2412	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
2413	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, MAF sensor filament burn-off, HO2S, EVAP canister purge valve, injector(s), excessive fuel in engine oil
3434	Oxygen sensor heater relay	Wiring, oxygen sensor heater relay



VAG type 4-digit	Fault location	Probable cause
4312	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid
4332	Engine control module (ECM) – output stages	Wiring, ECM controlled components
4343	Evaporative emission (EVAP) canister purge valve	Wiring, fuse, EVAP canister purge valve
4411	Injector 1	Wiring, fuse, injector
4412	Injector 2	Wiring, fuse, injector
4413	Injector 3	Wiring, fuse, injector
4414	Injector 4	Wiring, fuse, injector
4421	Injector 5	Wiring, injector
4422	Injector 6	Wiring, injector
4431	Idle air control (IAC) valve	Wiring, IAC valve
4433	Fuel pump relay	Wiring, fuse, fuel pump relay
4444	No fault found	–

**1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.

VAG type 5-digit	EOBD type	Fault location	Probable cause
–	P0	Refer to EOBD trouble code table	–
00000	–	No fault found	–
00263	–	Transmission control module (TCM) – incorrect signal	Wiring short to earth, TCM trouble code(s) stored, ECM
00268	–	Idle speed control (ISC) actuator	Wiring, ISC actuator
00281	–	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00282	–	Idle speed control (ISC) actuator/throttle motor	Throttle valve tight/sticking, wiring, multi-plug incorrectly wired, ISC actuator/throttle motor
00305	–	Instrument panel, fuel consumption signal	Wiring, instrument panel
00513 ■	–	Crankshaft position (CKP) sensor	Air gap, metal particles, insecure sensor/rotor, wiring, CKP sensor
00514	–	Crankshaft position (CKP) sensor	Air gap, insecure sensor/rotor, wiring, poor connection, CKP sensor
00515	–	Camshaft position (CMP) sensor	Air gap, insecure sensor/rotor, wiring, poor connection, fuse, distributor/camshaft alignment, CMP sensor
00516	–	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, throttle valve tight/sticking, wiring, CTP switch
00518	–	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00519	–	Manifold absolute pressure (MAP) sensor	TC wastegate regulating valve, hose connection(s), oil contamination, valve timing, poor connection, wiring, MAP sensor, ECM
00520	–	Mass air flow (MAF) sensor	Wiring, MAF sensor



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**Engine management**

VAG type 5-digit	EOBD type	Fault location	Probable cause
00521	–	Mixture adjustment resistor	Wiring, mixture adjustment resistor
00522	–	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	–	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
00524	–	Knock sensor (KS) 1	Wiring, KS, ECM
00525	–	Heated oxygen sensor (HO2S) 1 – implausible signal	Wiring, HO2S, heating inoperative, fuel level low
00526	–	Stop lamp switch	Wiring, stop lamp switch
00527	–	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
00528	–	Barometric pressure (BARO) sensor	Wiring, BARO sensor
00529	–	Crankshaft position (CKP) sensor	Wiring, CKP sensor
00530	–	Idle speed control (ISC) actuator/position sensor	Wiring, poor connection, multi-plug incorrectly wired, ISC actuator/position sensor
00532	–	Engine control module (ECM) – supply voltage	Fuse, alternator, battery, current draw with ignition OFF, engine control relay, wiring
00533	–	Idle speed control (ISC)	Intake leak/blockage, throttle valve tight/sticking, IAC valve or ISC actuator/position sensor
00534	–	Engine oil temperature (EOT) sensor	Wiring, EOT sensor
00535	–	Engine control module (ECM) – knock control 1	Wiring, KS, ECM
00536	–	Engine control module (ECM) – knock control 2	Wiring, KS, ECM
00537	–	Heated oxygen sensor (HO2S) – lambda control	CO adjustment, heating inoperative, intake/exhaust leak, misfire, fuel level low, fuel pressure/pump, injector(s), EVAP canister purge valve, MAP sensor, MAF sensor filament burn-off, wiring, HO2S
00539	–	Fuel temperature sensor	Wiring, fuel temperature sensor
00540	–	Knock sensor (KS) 2	Wiring, KS, ECM
00542	–	Injector needle lift sensor	Air in fuel system, fuel level low, wiring, injector needle lift sensor
00543	–	Maximum engine RPM exceeded	Incorrect gear shift, CKP/RPM sensor, AT fault, ECM
00544	–	Maximum boost pressure exceeded	Hoses interchanged/not connected, hoses blocked/leaking, TC wastegate actuator/regulating valve, MAP sensor
00545	–	ECM/TCM electrical connection	TCM trouble code(s) stored, wiring, transmission fault
00546	–	Data link connector (DLC) – defective	Wiring
00549	–	Instrument panel, fuel consumption signal	Wiring short to positive, instrument panel
00550	–	Start of injection – control	Wiring, fuel injection timing solenoid, injector needle lift sensor, air in fuel system, fuel level low, pump timing
00552	–	Volume air flow (VAF) sensor	Intake leak, wiring, VAF sensor
00553	–	Mass air flow (MAF) sensor	Intake leak, wiring, MAF sensor



VAG type 5-digit	EOBD type	Fault location	Probable cause
00554	—	Heated oxygen sensor (HO2S) – lambda control	CO adjustment, heating inoperative, intake/exhaust leak, misfire, fuel level low, fuel pressure/pump, injector(s), EVAP canister purge valve, MAP sensor, MAF sensor filament burn-off, wiring, HO2S
00555	—	Heated oxygen sensor (HO2S) 2 – implausible signal	Wiring, HO2S, heating inoperative, fuel level low
00557	—	Power steering pressure (PSP) switch – short to earth	Wiring short to earth, PSP switch
00560	—	Exhaust gas recirculation (EGR) – control difference	Intake leak, EGR valve/solenoid
00561	—	Mixture control (MC)	Trouble codes 00525/00533 stored, fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, MAP sensor, MAF sensor filament burn-off, HO2S, EVAP canister purge valve, injector(s), excessive fuel in engine oil
00575	—	Intake manifold pressure	Intake leak/blockage, MAF sensor, MAP sensor, TC wastegate actuator/regulating valve, hoses interchanged/not connected, wiring
00577	—	Knock control, cylinder 1 – control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00578	—	Knock control, cylinder 2 – control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00579	—	Knock control, cylinder 3 – control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00580	—	Knock control, cylinder 4 – control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00581	—	Knock control, cylinder 5 – control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00582	—	Knock control, cylinder 6 – control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00585	—	Exhaust gas recirculation temperature (EGRT) sensor	Wiring, EGRT sensor
00586	—	Exhaust gas recirculation (EGR) system – control	EGR solenoid
00609	—	Ignition amplifier, primary circuit 1	Wiring, ignition amplifier
00610	—	Ignition amplifier, primary circuit 2	Wiring, ignition amplifier
00611	—	Ignition amplifier, primary circuit 3	Wiring, ignition amplifier
00624	—	AC signal – compressor cut-in	Wiring, AC system
00625	—	Vehicle speed signal	Wiring, speedometer, VSS
00626	—	Glow plug warning lamp	Wiring, glow plug warning lamp
00627	—	Fuel filter water level sensor	Water in filter, wiring, fuel filter water level sensor
00628	—	Fuel injection pump control module – engine stop malfunction	Wiring, fuel injection pump
00635	—	Heated oxygen sensor (HO2S) 1, bank 1 – heater circuit malfunction	Wiring, HO2S
00638	—	ECM/TCM electrical connection	Wiring, transmission fault
00640	—	Oxygen sensor heater relay	Wiring, oxygen sensor heater relay



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**Engine management**


VAG type 5-digit	EOBD type	Fault location	Probable cause
00650	–	Clutch pedal position (CPP) switch – short to positive	Wiring short to positive, CPP switch
00653	–	Transmission control module (TCM)/TR sensor – implausible TR signal	Wiring, transmission fault, poor connection
00667	–	Outside air temperature signal	Wiring, instrument panel, AC system, outside air temperature sensor
00668	–	Engine control module (ECM) – supply voltage low	Battery, wiring, engine control relay
00670	–	Idle speed control (ISC) actuator position sensor	Wiring, throttle valve, ISC actuator position sensor
00671	–	Cruise control master switch	Wiring, cruise control master switch
00740	–	Camshaft position (CMP) sensor	Wiring, CMP sensor
00741	–	Stop lamp switch/brake pedal position (BPP) switch – implausible ratio	Wiring, both switch positions not synchronised, stop lamp switch, BPP switch
00750	–	Malfunction indicator lamp (MIL) – circuit malfunction	ECM incorrectly coded, wiring, MIL
00758	–	Secondary air injection (AIR) system	AIR solenoid/relay, wiring
00765	–	Fuel quantity adjuster position sensor	Wiring, fuel injection pump
00777	–	Accelerator pedal position (APP) sensor	Incorrectly adjusted, wiring, APP sensor
00792	–	AC pressure switch	Wiring, AC pressure switch
01013	–	AC compressor clutch, load signal	Wiring, AC system
01025	–	Malfunction indicator lamp (MIL)	Wiring, MIL
01028	–	Engine coolant blower motor relay	Wiring, engine coolant blower motor relay
01044	–	Engine control module (ECM) – coding	Incorrectly coded
01050	–	Glow plug monitoring	Fuse, wiring, glow plug relay, glow plugs
01052	–	Fuel lever position sensor	Wiring, fuel lever position sensor
01087	–	Engine control module (ECM) – basic setting	Basic setting not completed, throttle valve tight/sticking
01088	–	Mixture control (MC)	Fuel level low, fuel pressure/pump, MAP sensor, MAF sensor, intake/exhaust leak, EVAP canister purge valve, excessive fuel in engine oil, injector(s)
01117	–	Alternator load signal	Wiring, alternator
01119	–	Gear recognition signal – AT	Wiring
01120	–	Camshaft position (CMP) control, bank 1 – mechanical fault	Wiring, fuse, CMP actuator
01121	–	Camshaft position (CMP) control, bank 2 – mechanical fault	Wiring, fuse, CMP actuator
01126	–	Engine RPM signal	Wiring, CKP/RPM sensor, instrument panel
01163	–	Backfire	Intake leak, wiring, ignition amplifier, injector(s)
01165	–	Idle speed control (ISC) actuator/throttle motor	Accelerator cable adjustment, throttle valve, wiring, ISC actuator/throttle motor, basic setting not carried out
01167	–	Full throttle stop solenoid	Wiring, full throttle stop valve
01168	–	Idle speed boost solenoid	Wiring, full throttle stop valve, idle speed boost solenoid

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**AUDI**



## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
01169	–	Door contact switch, driver's	Wiring, door contact switch
01170	–	Fuel injection timing sensor	Wiring, fuel injection timing sensor
01177	–	Engine control module (ECM) – defective	ECM
01180	–	Engine/AC electrical connection	Wiring
01182 	–	Mass air flow (MAF) sensor/throttle position (TP) sensor – signal incompatibility	Throttle valve sticking, ISC actuator/throttle motor sticking/mechanically damaged, incorrect throttle control unit, intake leak between MAF sensor and throttle valve, air filter blocked
01183	–	Malfunction indicator lamp (MIL) – circuit malfunction	ECM incorrectly coded, wiring, MIL
01193	–	Engine coolant heater relay 1, low output	Wiring, engine coolant heater relay
01194	–	Engine coolant heater relay 2, high output	Wiring, engine coolant heater relay
01196	–	CAN data bus, TCM – incorrect signal	Wiring
01204	–	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
01208	–	Engine control module (ECM) – data changed	ECM
01209	–	Alternator speed signal	Wiring, alternator
01235	–	Secondary air injection (AIR) solenoid	Wiring, AIR solenoid
01237	–	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid
01242	–	Engine control module (ECM) – output stages	Wiring, ECM controlled components
01243	–	Intake manifold air control solenoid	Wiring, intake manifold air control solenoid
01247	–	Evaporative emission (EVAP) canister purge valve	Wiring, fuse, EVAP canister purge valve
01249	–	Injector 1	Wiring, fuse, injector
01250	–	Injector 2	Wiring, fuse, injector
01251	–	Injector 3	Wiring, fuse, injector
01252	–	Injector 4	Wiring, fuse, injector
01253	–	Injector 5	Wiring, injector
01254	–	Injector 6	Wiring, injector
01257	–	Idle air control (IAC) valve	Wiring, IAC valve
01259	–	Fuel pump relay	Wiring, fuse, fuel pump relay
01262	–	Turbocharger (TC) wastegate regulating valve	Wiring, fuse, TC wastegate regulating valve
01265	–	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid
01266	–	Glow plug relay	Wiring, glow plug relay
01268	–	Fuel quantity adjuster	Incorrectly set, wiring, fuel injection pump
01269	–	Fuel injection timing solenoid	Wiring, fuel injection timing solenoid
01282	–	Intake manifold air control solenoid	Wiring, intake manifold air control solenoid
01283	–	Intake manifold air control actuator	Wiring, intake manifold flap, intake manifold air control actuator
01312	–	CAN data bus – defective	Trouble code(s) stored in other system(s), wiring



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**Engine management**

<b>VAG type 5-digit</b>	<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
01314	–	Engine control module (ECM), cruise control system – defective	ECM
01315	–	CAN data bus, TCM – no signal	TCM trouble code(s) stored, wiring, matching resistor in ECM
01316	–	CAN data bus, ABS – defective	ABS control module incorrectly coded, wiring
01317	–	CAN data bus, instrumentation	Trouble code(s) stored in other system(s), wiring, instrumentation control module
01318	–	Fuel injection pump control module	Data bus wiring, fuel injection pump
01321	–	CAN data bus, SRS	SRS control module trouble code(s) stored, wiring
01375	–	Engine mounting control solenoid, bank 1 & 2	Wiring, engine mounting control solenoid
01376	–	Fuel injection pump position sensor	Wiring, fuel injection pump position sensor
01437 <b>3</b>	–	Throttle control unit – basic setting	Basic setting not carried out, CTP switch, ISC actuator/position sensor, TP sensor
01440	–	Fuel level signal	Wiring, instrument panel, fuel gauge tank sensor
01441	–	Fuel low level sensor	Wiring, fuel transfer pump, fuel level sensor
01442	–	Engine misfire – fuel pump housing empty	Fuel level low, fuel transfer pump
01575	–	Auxiliary drive – switched OFF	Auxiliary drive overloaded
01613	–	Fuel cooling pump relay – circuit malfunction	Wiring, fuel cooling pump relay
01656	–	SRS control module – crash signal	Wiring
01686	–	Engine coolant blower motor run-on relay	Wiring, engine coolant blower motor run-on relay
01695	–	Fuel temperature sensor – circuit malfunction	Wiring, fuel temperature sensor
16394	–	Camshaft position (CMP) actuator, intake/left/front, bank 1 – circuit malfunction	Wiring, CMP actuator
16395	–	Camshaft position (CMP), intake/left/front, bank 1 – timing over advanced/system performance	Valve timing, camshaft position (CMP) actuator
16396	–	Camshaft position (CMP), intake/left/front, bank 1 – timing over retarded	Valve timing, camshaft position (CMP) actuator
16398	–	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 – timing over advanced/system performance	Valve timing, camshaft position (CMP) actuator
16399	–	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 – timing over retarded	Valve timing, camshaft position (CMP) actuator
16414	–	Heated oxygen sensor (HO2S) 1, bank 1, heater control – circuit malfunction	Wiring open circuit, HO2S
16415	–	Heated oxygen sensor (HO2S) 1, bank 1, heater control – circuit low	Wiring short to earth, HO2S
16416	–	Heated oxygen sensor (HO2S) 1, bank 1, heater control – circuit high	Wiring short to positive, HO2S
16474	–	Fuel metering solenoid – open circuit	Wiring open circuit, fuel metering solenoid
16475	–	Fuel metering solenoid – short to earth	Wiring short to earth, fuel metering solenoid
16476	–	Fuel metering solenoid – short to positive	Wiring short to positive, fuel metering solenoid





VAG type 5-digit	EOBD type	Fault location	Probable cause
16485	–	Mass air flow (MAF) sensor, bank 1 – range/performance problem	Intake leak, wiring, MAF sensor
16486	–	Mass air flow (MAF) sensor, bank 1 – low input	Intake leak, air filter blocked, wiring short to earth, fuse, MAF sensor
16487	–	Mass air flow (MAF) sensor, bank 1 – high input	Wiring short to positive, earth wire defective, MAF sensor
16490	–	Manifold absolute pressure (MAP) sensor/ barometric pressure (BARO) sensor – range/performance problem	Intake/exhaust leak, wiring, MAP sensor, BARO sensor
16491	–	Manifold absolute pressure (MAP) sensor/ barometric pressure (BARO) sensor – low input	Wiring short to earth, MAP sensor, BARO sensor
16492	–	Manifold absolute pressure (MAP) sensor/ barometric pressure (BARO) sensor – high input	Wiring short to positive, MAP sensor, BARO sensor
16496	–	Intake air temperature (IAT) sensor – low input	Wiring short to earth, IAT sensor
16497	–	Intake air temperature (IAT) sensor – high input	Wiring open circuit/short to positive, earth wire defective, IAT sensor
16500	–	Engine coolant temperature (ECT) sensor – range/performance problem	Coolant thermostat, poor connection, wiring, ECT sensor
16501	–	Engine coolant temperature (ECT) sensor – low input	Coolant thermostat, wiring short to earth, ECT sensor
16502	–	Engine coolant temperature (ECT) sensor – high input	Coolant thermostat, wiring open circuit/short to positive, earth wire defective, ECT sensor
16504	–	Throttle position (TP) sensor – circuit malfunction	Poor connection, wiring, TP sensor
16505	–	Throttle position (TP) sensor – range/performance problem	Poor connection, TP sensor
16506	–	Throttle position (TP) sensor – low input	Signal wire short to earth, supply wire defective, TP sensor
16507	–	Throttle position (TP) sensor – high input	Signal wire open circuit/short to positive, earth wire defective, TP sensor
16514	–	Heated oxygen sensor (HO2S) 1, bank 1 – circuit malfunction	Heating inoperative, poor connection, wiring, HO2S
16515	–	Heated oxygen sensor (HO2S) 1, bank 1 – voltage low	Wiring short to earth, HO2S
16516	–	Heated oxygen sensor (HO2S) 1, bank 1 – voltage high	Wiring short to positive, HO2S
16517	–	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Heating inoperative, wiring, HO2S
16518	–	Heated oxygen sensor (HO2S) 1, bank 1 – no activity detected	Wiring open circuit, heating inoperative, HO2S
16519	–	Heated oxygen sensor (HO2S) 1, bank 1 – heater circuit malfunction	Fuse, wiring, HO2S
16520	–	Heated oxygen sensor (HO2S) 2, bank 1 – circuit malfunction	Heating inoperative, wiring, HO2S
16521	–	Heated oxygen sensor (HO2S) 2, bank 1 – low voltage	Wiring short to earth, exhaust leak, HO2S

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**Engine management**

<b>VAG type 5-digit</b>	<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
16522	–	Heated oxygen sensor (HO2S) 2, bank 1 – high voltage	Wiring short to positive, HO2S
16523	–	Heated oxygen sensor (HO2S) 2, bank 1 – slow response	Heating inoperative, wiring, HO2S
16524	–	Heated oxygen sensor (HO2S) 2, bank 1 – no activity detected	Wiring, HO2S
16525	–	Heated oxygen sensor (HO2S) 2, bank 1 – heater circuit malfunction	Wiring, HO2S
16534	–	Heated oxygen sensor (HO2S) 1, bank 2 – circuit malfunction	Wiring, HO2S
16535	–	Heated oxygen sensor (HO2S) 1, bank 2 – low voltage	Wiring short to earth, HO2S
16536	–	Heated oxygen sensor (HO2S) 1, bank 2 – high voltage	Wiring short to positive, HO2S
16537	–	Heated oxygen sensor (HO2S) 1, bank 2 – slow response	Heating inoperative, wiring, HO2S
16538	–	Heated oxygen sensor (HO2S) 1, bank 2 – no activity detected	Wiring, HO2S
16540	–	Heated oxygen sensor (HO2S) 2, bank 2 – circuit malfunction	Heating inoperative, wiring, HO2S
16541	–	Heated oxygen sensor (HO2S) 2, bank 2 – low voltage	Wiring short to earth, exhaust leak, HO2S
16542	–	Heated oxygen sensor (HO2S) 2, bank 2 – high voltage	Wiring short to positive, HO2S
16543	–	Heated oxygen sensor (HO2S) 2, bank 2 – slow response	Heating inoperative, wiring, HO2S
16544	–	Heated oxygen sensor (HO2S) 2, bank 2 – no activity detected	Wiring, HO2S
16545	–	Heated oxygen sensor (HO2S) 2, bank 2 – heater circuit malfunction	Wiring, HO2S
16554	–	Fuel trim (FT), bank 1 – malfunction	Intake leak, AIR system, fuel pressure/pump, injector(s), EVAP canister purge valve, HO2S
16555	–	System too lean, bank 1	Intake/exhaust leak, AIR system, MAP sensor, MAF sensor, fuel pressure/pump, injector(s), EVAP canister purge valve, HO2S
16556	–	System too rich, bank 1	EVAP canister purge valve, fuel pressure, injector(s), HO2S
16557	–	Fuel trim (FT), bank 2 – malfunction	Fuel pressure/pump, injector(s), AIR system, hose connection(s), intake leak
16558	–	System too lean, bank 2	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose connection(s)
16559	–	System too rich, bank 2	Fuel pressure, injector(s), EVAP canister purge valve
16575	–	Fuel rail pressure (FRP) sensor – range/ performance problem	Wiring, FRP sensor
16576	–	Fuel rail pressure (FRP) sensor – low input	Wiring short to earth, FRP sensor
16577	–	Fuel rail pressure (FRP) sensor – high input	Wiring short to positive, FRP sensor

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**AUDI**



Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
16578	–	Fuel rail pressure (FRP) sensor – circuit intermittent	Wiring open circuit, FRP sensor
16581	–	Engine oil temperature (EOT) sensor – low input	Wiring short to earth, EOT sensor
16582	–	Engine oil temperature (EOT) sensor – high input	Wiring short to positive, EOT sensor
16585	–	Injector 1 – circuit malfunction	Wiring, injector
16586	–	Injector 2 – circuit malfunction	Wiring, injector
16587	–	Injector 3 – circuit malfunction	Wiring, injector
16588	–	Injector 4 – circuit malfunction	Wiring, injector
16589	–	Injector 5 – circuit malfunction	Wiring, injector
16590	–	Injector 6 – circuit malfunction	Wiring, injector
16603	–	Engine over speed condition	Incorrect gear change
16605	–	Throttle position (TP) sensor B – range/performance problem	Wiring, TP sensor
16606	–	Throttle position (TP) sensor B – low input	Wiring short to earth, TP sensor
16607	–	Throttle position (TP) sensor B – high input	Wiring short to positive, TP sensor
16610	–	Accelerator pedal position (APP) sensor A/B – range/performance problem	Wiring, APP sensor
16611	–	Accelerator pedal position (APP) sensor A – low input	Wiring short to earth, APP sensor
16612	–	Accelerator pedal position (APP) sensor A – high input	Wiring short to positive, APP sensor
16614	–	Fuel pump relay – circuit malfunction	Wiring, fuel pump relay
16618	–	Engine boost condition – limit exceeded	Hose connection(s), wiring, TC wastegate regulating valve, TC wastegate
16619	–	Engine boost condition – limit not reached	Hose connection(s), wiring, TC wastegate regulating valve, TC wastegate
16620	–	Manifold absolute pressure (MAP) sensor A, TC system – range/performance problem	Intake/exhaust leak, hose connection(s), MAP sensor
16621	–	Manifold absolute pressure (MAP) sensor A, TC system – low input	Wiring short to earth, MAP sensor
16622	–	Manifold absolute pressure (MAP) sensor A, TC system – high input	Wiring short to positive, MAP sensor
16627	–	Turbocharger (TC) wastegate regulating valve A – circuit malfunction	Wiring, TC wastegate regulating valve
16629	–	Turbocharger (TC) wastegate regulating valve A – circuit low	Wiring short to earth, TC wastegate regulating valve
16630	–	Turbocharger (TC) wastegate regulating valve A – circuit high	Wiring short to positive, TC wastegate regulating valve
16645	–	Injector 1 – circuit low	Wiring short to earth, injector
16646	–	Injector 1 – circuit high	Wiring short to positive, injector
16648	–	Injector 2 – circuit low	Wiring short to earth, injector
16649	–	Injector 2 – circuit high	Wiring short to positive, injector
16651	–	Injector 3 – circuit low	Wiring short to earth, injector



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Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93→) • A4/S4  
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**Engine management**

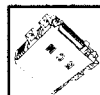
VAG type 5-digit	EOBD type	Fault location	Probable cause
16652	–	Injector 3 – circuit high	Wiring short to positive, injector
16654	–	Injector 4 – circuit low	Wiring short to earth, injector
16655	–	Injector 4 – circuit high	Wiring short to positive, injector
16657	–	Injector 5 – circuit low	Wiring short to earth, injector
16658	–	Injector 5 – circuit high	Wiring short to positive, injector
16660	–	Injector 6 – circuit low	Wiring short to earth, injector
16661	–	Injector 6 – circuit high	Wiring short to positive, injector
16684	–	Random/multiple cylinder(s) – misfire detected	Spark plug(s), HT lead(s), injector(s), ignition coil(s), low compression, wiring
16685	–	Cylinder 1 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16686	–	Cylinder 2 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16687	–	Cylinder 3 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16688	–	Cylinder 4 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16689	–	Cylinder 5 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16690	–	Cylinder 6 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16691	–	Cylinder 7 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16692	–	Cylinder 8 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16705	–	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – range/performance problem	Air gap, metal particles, insecure sensor/rotor, wiring, CKP/RPM sensor
16706	–	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal	Wiring, CKP/RPM sensor
16709	–	Knock sensor (KS) 1, bank 1 – circuit malfunction	Wiring, poor connection, KS
16710	–	Knock sensor (KS) 1, bank 1 – range/performance problem	Wiring, KS incorrectly tightened, KS
16711	–	Knock sensor (KS) 1, bank 1 – low input	Insecure KS, poor connection, wiring short to earth, incorrectly tightened, KS
16712	–	Knock sensor (KS) 1, bank 1 – high input	Wiring short to positive, KS incorrectly tightened, KS
16716	–	Knock sensor (KS) 2, bank 2 – low input	Insecure KS, poor connection, wiring short to earth, KS incorrectly tightened, KS
16717	–	Knock sensor (KS) 2, bank 2 – high input	Wiring short to positive, KS incorrectly tightened, KS
16719	–	Crankshaft position (CKP) sensor – circuit malfunction	Wiring, CKP/RPM sensor
16721	–	Crankshaft position (CKP) sensor – low input	Insecure sensor, air gap, wiring short to earth, CKP/RPM sensor



VAG type 5-digit	EOBD type	Fault location	Probable cause
16724	—	Camshaft position (CMP) sensor A, bank 1 – circuit malfunction	Wiring, CMP sensor
16725	—	Camshaft position (CMP) sensor A, bank 1 – range/performance problem	Insecure sensor/rotor, air gap, wiring, CMP sensor
16726	—	Camshaft position (CMP) sensor A, bank 1 – low input	Wiring short to earth, CMP sensor
16727	—	Camshaft position (CMP) sensor A, bank 1 – high input	Wiring short to positive, CMP sensor
16730 ■	—	Camshaft position (CMP) sensor A, bank 2 – range/performance problem	Insecure sensor/rotor, air gap, wiring, CMP sensor
16731 ■	—	Camshaft position (CMP) sensor A, bank 2 – low input	Wiring short to earth, CMP sensor
16732 ■	—	Camshaft position (CMP) sensor A, bank 2 – high input	Wiring short to positive, CMP sensor
16735	—	Ignition coil, cylinder 1, primary/secondary – circuit malfunction	Wiring, ignition amplifier, ignition coil
16736	—	Ignition coil, cylinder 2, primary/secondary – circuit malfunction	Wiring, ignition amplifier, ignition coil
16737	—	Ignition coil, cylinder 3, primary/secondary – circuit malfunction	Wiring, ignition amplifier, ignition coil
16738	—	Ignition coil, cylinder 4, primary/secondary – circuit malfunction	Wiring, ignition amplifier, ignition coil
16764	—	Glow plugs – circuit A malfunction	Wiring, glow plug relay, fuse, glow plugs
16784	—	Exhaust gas recirculation (EGR) system – flow malfunction	Basic setting not carried out, EGR valve/solenoid
16785	—	Exhaust gas recirculation (EGR) system – insufficient flow detected	Hose leak/blockage, basic setting not carried out, EGR valve/solenoid
16786	—	Exhaust gas recirculation (EGR) system – excessive flow detected	EGR valve/solenoid, basic setting not carried out
16787	—	Exhaust gas recirculation (EGR) system – circuit malfunction	Wiring, EGR valve/solenoid
16788	—	Exhaust gas recirculation (EGR) system – range/performance problem	Hose connection(s), wiring, EGR valve/solenoid
16791	—	Exhaust gas recirculation (EGR) valve position sensor – low input	Wiring short to earth, EGR valve position sensor
16792	—	Exhaust gas recirculation (EGR) valve position sensor – high input	Wiring short to positive, EGR valve position sensor
16795	—	Secondary air injection (AIR) system – incorrect flow detected	AIR pump, AIR valve, AIR hose(s)
16796	—	Secondary air injection (AIR) solenoid A – circuit malfunction	Wiring, AIR solenoid
16802	—	Secondary air injection (AIR) pump relay A – circuit malfunction	Wiring, AIR pump relay
16804	—	Catalytic converter system, bank 1 – efficiency below threshold	Catalytic converter
16806	—	Main catalytic converter, bank 1 – efficiency below threshold	Catalytic converter



VAG type 5-digit	EOBD type	Fault location	Probable cause
16814	–	Catalytic converter system, bank 2 – efficiency below threshold	Catalytic converter
16824	–	Evaporative emission (EVP) system – malfunction	Hose connection(s), intake leak, EVP canister purge valve
16825	–	Evaporative emission (EVP) system – incorrect flow detected	Hose connection(s), intake leak, EVP canister purge valve
16826	–	Evaporative emission (EVP) system – small leak detected	Hose connection(s), intake leak, EVP canister, EVP canister purge valve
16827	–	Evaporative emission (EVP) canister purge valve – circuit malfunction	Wiring, EVP canister purge valve
16828	–	Evaporative emission (EVP) canister purge valve – open circuit	Wiring open circuit, EVP canister purge valve
16829	–	Evaporative emission (EVP) canister purge valve – short circuit	Wiring short circuit, EVP canister purge valve
16839	–	Evaporative emission (EVP) system – large leak detected	Hose connection(s), intake leak, EVP canister, EVP canister purge valve
16845	–	Fuel tank level sensor – range/performance problem	Wiring, fuel tank level sensor
16864	–	Engine coolant blower motor 1 – circuit malfunction	Wiring, engine coolant blower motor
16865	–	Engine coolant blower motor 2 – circuit malfunction	Wiring, engine coolant blower motor
16885	–	Vehicle speed sensor (VSS) – range/performance problem	Wiring, speedometer, VSS, CAN data bus
16887	–	Vehicle speed sensor (VSS) – intermittent/erratic/high input	Wiring, other connected system, instrument panel, VSS
16890 	–	Idle speed control (ISC) system – rpm lower than expected	Throttle control unit
16891 	–	Idle speed control (ISC) system – rpm higher than expected	Throttle control unit
16894	–	Closed throttle position (CTP) switch – circuit malfunction	Wiring, CTP switch
16916	–	AC refrigerant pressure sensor – low input	AC refrigerant pressure too low (incorrectly charged), wiring, AC refrigerant pressure sensor
16917	–	AC refrigerant pressure sensor – high input	AC refrigerant pressure too high (cooling fault incorrectly charged), wiring, AC refrigerant pressure sensor
16928	–	Exhaust gas recirculation temperature (EGRT) sensor, bank 1 – circuit malfunction	Wiring, EGRT sensor
16929	–	Exhaust gas recirculation temperature (EGRT) sensor, bank 1 – low input	Wiring short to earth, EGRT sensor
16930	–	Exhaust gas recirculation temperature (EGRT) sensor, bank 1 – high input	Wiring short to positive, EGRT sensor
16935	–	Power steering pressure (PSP) sensor/switch – range/performance problem	Wiring, PSP switch
16944	–	System voltage – malfunction	Fuse(s), battery, wiring, engine control relay
16946	–	System voltage – low	Fuse(s), battery, wiring, engine control relay



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**AUDI**



Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
16947	—	System voltage — high	Alternator, wiring
16952	—	Cruise control master/selector switch, SET signal — malfunction	Wiring, cruise control master/selector switch
16955	—	Stop lamp switch/brake pedal position (BPP) switch — circuit malfunction	Wiring, stop lamp switch, BPP switch
16983	—	CAN data bus — malfunction	Trouble code(s) stored in other system, wiring
16984	—	CAN data bus — malfunction	Trouble code(s) stored in other system, wiring
16985	—	Engine control module (ECM) — memory check sum error	ECM
16987	—	Engine control module (ECM) — KAM error	ECM
16988	—	Engine control module (ECM) — RAM error	ECM
16989	—	Engine control module (ECM) — ROM error	ECM
16990	—	Engine control module (ECM) — PCM processor fault	ECM
17022 ■	—	Throttle actuator control, bank 1 — range/performance problem	Basic setting not carried out, throttle control unit, APP sensor
17026	—	Engine control module (ECM), knock control — defective	ECM
17029	—	Air conditioning	Wiring, AC system
17034	—	Malfunction indicator lamp (MIL) — circuit malfunction	Wiring, MIL
17040	—	Instrument panel, fuel consumption signal — circuit malfunction	Wiring
17071	—	Engine control relay — short to earth	Wiring short to earth, engine control relay
17072	—	Engine control relay — short to positive	Wiring short to positive, engine control relay
17075	—	Engine coolant blower motor 1 — short to earth	Wiring short to earth, engine coolant blower motor
17076	—	Engine coolant blower motor 1 — short to positive	Wiring short to positive, engine coolant blower motor
17077	—	Engine coolant blower motor 2 — short to earth	Wiring short to earth, engine coolant blower motor
17078	—	Engine coolant blower motor 2 — short to positive	Wiring short to positive, engine coolant blower motor
17091	—	Transmission range (TR) sensor — low input	Wiring short to earth, TR sensor
17092	—	Transmission range (TR) sensor — high input	Wiring short to positive, TR sensor
—	P0	Refer to EOBD trouble code table	—
17428	P1020	Fuel pressure — control limit exceeded	Wiring, fuel pressure sensor, fuel pressure control valve, high pressure fuel pump
17431	P1023	Fuel pressure control valve — short to earth	Wiring short to earth, fuel pressure control valve
17432	P1024	Fuel pressure control valve — open circuit	Wiring open circuit, fuel pressure control valve
17433	P1025	Fuel pressure control valve — mechanical fault	Fuel pressure control valve
17434	P1026	Intake manifold air control solenoid — short to positive	Wiring short to positive, intake manifold air control solenoid



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VAG type 5-digit	EOBD type	Fault location	Probable cause
17435	P1027	Intake manifold air control solenoid – short to earth	Wiring short to earth, intake manifold air control solenoid
17436	P1028	Intake manifold air control solenoid – open circuit	Wiring open circuit, intake manifold air control solenoid
17437	P1029	Intake manifold air control valve position sensor – upper limit not reached	Air control flap tight/sticking, hose connection(s), intake manifold air control actuator
17438	P1030	Intake manifold air control valve position sensor – lower limit not reached	Air control flap tight/sticking, hose connection(s), intake manifold air control actuator
17439	P1031	Intake manifold air control valve position sensor – specification not attained	Air control flap tight/sticking, hose connection(s), intake manifold air control actuator, intake manifold air control solenoid
17440 ■	P1032	Nitrogen oxides (NOx) sensor – signal too high	Catalytic converter, wiring short to positive, NOx sensor
17441 ■	P1033	Nitrogen oxides (NOx) sensor – signal too low	Exhaust leak, wiring short to earth, NOx sensor
17442 ■	P1034	Nitrogen oxides (NOx) sensor – signal outside tolerance	Catalytic converter, exhaust leak, wiring, NOx sensor
17443 ■	P1035	Nitrogen oxides (NOx) sensor – range/performance problem	Wiring, heating inoperative, NOx sensor
17444 6	P1036	Nitrogen oxides (NOx) heater sensor – short to positive	Wiring short to positive, NOx sensor
17445 6	P1037	Nitrogen oxides (NOx) heater sensor – short to earth	Wiring short to earth, NOx sensor
17446 ■	P1038	Nitrogen oxides (NOx) heater sensor – open circuit	Wiring open circuit, NOx sensor
17447	P1039	Injector 1, supply voltage – short circuit	Wiring, injector
17448	P1040	Injector 1, supply voltage – circuit malfunction	Wiring, injector
17449	P1041	Injector 2, supply voltage – short circuit	Wiring, injector
17450	P1042	Injector 2, supply voltage – circuit malfunction	Wiring, injector
17451	P1043	Injector 3, supply voltage – short circuit	Wiring, injector
17452	P1044	Injector 3, supply voltage – circuit malfunction	Wiring, injector
17453	P1045	Injector 4, supply voltage – short circuit	Wiring, injector
17454	P1046	Injector 4, supply voltage – circuit malfunction	Wiring, injector
17455	P1047	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 – circuit malfunction	Wiring, camshaft position (CMP) actuator
17456	P1048	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 – short to positive	Wiring short to positive, camshaft position (CMP) actuator
17457	P1049	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 – short to earth	Wiring short to earth, camshaft position (CMP) actuator
17458	P1050	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 – open circuit	Wiring open circuit, camshaft position (CMP) actuator
17471	P1063	Fuel pressure – control limit not reached	Air in fuel system, fuel leak, fuel lift pump, fuel bypass valve, fuel pressure control valve, high pressure fuel pump







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VAG type 5-digit	EOBD type	Fault location	Probable cause
17472	P1064	Fuel pressure – mechanical fault	Air in fuel system, fuel leak, fuel lift pump, fuel bypass valve, fuel pressure control valve, high pressure fuel pump
17473	P1065	Fuel pressure – system deviation	Air in fuel system, fuel leak, fuel lift pump, fuel bypass valve, fuel pressure control valve, high pressure fuel pump
17474	P1066	Intake manifold air control solenoid – short to positive	Wiring short to positive, intake manifold air control solenoid
17475	P1067	Intake manifold air control solenoid – short to earth	Wiring short to earth, intake manifold air control solenoid
17476	P1068	Intake manifold air control solenoid – open circuit	Wiring open circuit, intake manifold air control solenoid
17477 	P1069	Nitrogen oxides (NOx) sensor – heater control – short to earth	Wiring short to earth, NOx sensor
17478 	P1070	Nitrogen oxides (NOx) sensor – heater control – short to positive	Wiring short to positive, NOx sensor
17479 	P1071	Nitrogen oxides (NOx) sensor – heater control – incorrect signal	Wiring, NOx sensor
17480 	P1072	Nitrogen oxides (NOx) sensor – heater control – circuit malfunction	Wiring, NOx sensor
17501	P1093	Mixture control (MC), bank 1 – malfunction	Fuel pressure/pump, injector(s) intake leak
17509	P1101	Heated oxygen sensor (HO2S) 1, bank 1 – low voltage/air leak	Intake/exhaust leak, fuel pressure/pump, wiring short to earth, HO2S
17510	P1102	Heated oxygen sensor (HO2S) 1, bank 1 – heater short to positive	Wiring short to positive, HO2S
17511	P1103	Heated oxygen sensor (HO2S) 1, bank 1 – heater output too low	Wiring, HO2S
17513	P1105	Heated oxygen sensor (HO2S) 2, bank 1 – heater short to positive	Wiring short to positive, HO2S
17514	P1106	Heated oxygen sensor (HO2S) 1, bank 2 – low voltage/air leak	Intake/exhaust leak, fuel pressure/pump, wiring short to earth, HO2S
17515	P1107	Heated oxygen sensor (HO2S) 1, bank 2 – heater short to positive	Wiring short to positive, HO2S
17518	P1110	Heated oxygen sensor (HO2S) 2, bank 2 – heater short to positive	Wiring short to positive, HO2S
17519	P1111	Heated oxygen sensor (HO2S) control, bank 1 – system too lean	Intake/exhaust leak, injector blocked, MAP sensor, MAF sensor, fuel pressure/pump, HO2S
17520	P1112	Heated oxygen sensor (HO2S) control, bank 1 – system too rich	Excessive fuel in engine oil, injector leaking, fuel pressure, EVAP canister purge valve, MAP sensor, MAF sensor, HO2S
17521	P1113	Heated oxygen sensor (HO2S) 1, bank 1 – heater resistance too high	Wiring, HO2S
17522	P1114	Heated oxygen sensor (HO2S) 2, bank 1 – heater resistance too high	Wiring, HO2S
17523	P1115	Heated oxygen sensor (HO2S) 1, bank 1 – heater short to earth	Wiring short to earth, HO2S
17524	P1116	Heated oxygen sensor (HO2S) 1, bank 1 – heater open circuit	Wiring open circuit, HO2S



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**Engine management**

VAG type 5-digit	EOBD type	Fault location	Probable cause
17525	P1117	Heated oxygen sensor (HO2S) 2, bank 1 – heater short to earth	Wiring short to earth, HO2S
17526	P1118	Heated oxygen sensor (HO2S) 2, bank 1 – heater open circuit	Wiring open circuit, HO2S
17527	P1119	Heated oxygen sensor (HO2S) 1, bank 2 – heater short to earth	Wiring short to earth, HO2S
17528	P1120	Heated oxygen sensor (HO2S) 1, bank 2 – heater open circuit	Wiring open circuit, HO2S
17529	P1121	Heated oxygen sensor (HO2S) 2, bank 2 – heater short to earth	Wiring short to earth, HO2S
17530	P1122	Heated oxygen sensor (HO2S) 2, bank 2 – heater open circuit	Wiring open circuit, HO2S
17535	P1127	Long term fuel trim, entire speed/load range, bank 1 – system too rich	Excessive fuel in engine oil, fuel pressure, EVAP canister purge valve, injector(s)
17536	P1128	Long term fuel trim, entire speed/load range, bank 1 – system too lean	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose leak
17537	P1129	Long term fuel trim, entire speed/load range, bank 2 – system too rich	Excessive fuel in engine oil, fuel pressure, EVAP canister purge valve, injector(s)
17538	P1130	Long term fuel trim, entire speed/load range, bank 2 – system too lean	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose leak
17539	P1131	Heated oxygen sensor (HO2S) 1, bank 1 – heater resistance too high	Wiring, HO2S
17540	P1132	Heated oxygen sensor (HO2S) 1, bank 1 & 2 – heater control – circuit high	Wiring short to positive, HO2S
17541	P1133	Heated oxygen sensor (HO2S) 1, bank 1 & 2 – heater control – circuit low	Wiring open circuit/short to earth, HO2S
17544	P1136	Long term fuel trim, idling, bank 1 – system too lean	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose leak
17545	P1137	Long term fuel trim, idling, bank 1 – system too rich	Fuel pressure, injector(s), EVAP canister purge valve
17546	P1138	Long term fuel trim, idling, bank 2 – system too lean	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose leak
17547	P1139	Long term fuel trim, idling, bank 2 – system too rich	Fuel pressure, injector(s), EVAP canister purge valve
17548	P1140	Heated oxygen sensor (HO2S) 2, bank 2 – heater resistance too high	Wiring, HO2S
17549	P1141	Load calculation – implausible value	Wiring, MAP sensor, MAF sensor
17550	P1142	Load calculation – too low	Throttle control unit, MAP sensor, MAF sensor, APP sensor
17551	P1143	Load calculation – too high	Throttle control unit, MAP sensor, MAF sensor, APP sensor
17552	P1144	Mass air flow (MAF) sensor, bank 1 – open circuit/short to earth	Wiring open circuit/short to earth, MAF sensor
17553	P1145	Mass air flow (MAF) sensor, bank 1 – short to positive	Wiring short to positive, MAF sensor
17554	P1146	Mass air flow (MAF) sensor, bank 1 – supply voltage	Operating voltage too high/low, wiring

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VAG type 5-digit	EOBD type	Fault location	Probable cause
17555	P1147	Heated oxygen sensor (HO2S) 1, bank 2 – lambda regulation, system too lean	Intake leak, wiring, HO2S
17556	P1148	Heated oxygen sensor (HO2S) 1, bank 2 – lambda regulation, system too rich	Exhaust leak, wiring, HO2S
17557	P1149	Heated oxygen sensor (HO2S) 1, bank 1 – implausible lambda control value	Exhaust leak, wiring, HO2S
17558	P1150	Heated oxygen sensor (HO2S) 1, bank 2 – implausible lambda control value	Exhaust leak, wiring, HO2S
17559	P1151	Long term fuel trim 1, bank 1 – below lean limit	Fuel pressure/pump, injectors, intake/exhaust leak, HO2S
17560	P1152	Long term fuel trim 2, bank 1 – below lean limit	Fuel pressure/pump, injectors, intake/exhaust leak, AIR system, HO2S
17561	P1153	Heated oxygen sensor (HO2S) 2, bank 1 & 2 – interchanged	HO2S 2 on bank 1 & 2 incorrectly installed
17563	P1155	Manifold absolute pressure (MAP) sensor – short to positive	Wiring short to positive, MAP sensor
17564	P1156	Manifold absolute pressure (MAP) sensor – open circuit/short to earth	Wiring open circuit/short to earth, MAP sensor
17565	P1157	Manifold absolute pressure (MAP) sensor – supply voltage	Wiring, MAP sensor
17566	P1158	Manifold absolute pressure (MAP) sensor – range/performance problem	Wiring, hose connection(s), MAP sensor
17567	P1159	Mass air flow (MAF) sensor, bank 1 & 2 – implausible ratio	EGR system, intake leak, wiring, MAF sensor 1/2
17568	P1160	Intake air temperature (IAT) sensor – short to earth	Wiring short to earth, IAT sensor
17569	P1161	Intake air temperature (IAT) sensor – open circuit/short to positive	Wiring open circuit/short to positive, IAT sensor
17570	P1162	Fuel temperature sensor – short to earth	Wiring short to earth, fuel temperature sensor
17571	P1163	Fuel temperature sensor – open circuit/short to positive	Wiring open circuit/short to positive, fuel temperature sensor
17572	P1164	Fuel temperature sensor – range/performance problem	Wiring, fuel temperature sensor
17573	P1165	Long term fuel trim 1, bank 1 – above rich limit	Fuel pressure/pump, injectors, EVAP canister purge valve, EGR system, HO2S, intake/exhaust system
17574	P1166	Long term fuel trim 2, bank 1 – above rich limit	Fuel pressure/pump, injectors, EVAP canister purge valve, EGR system, HO2S, intake/exhaust system
17575	P1167	Mass air flow (MAF) sensor, bank 2 – range/performance problem	Intake leak, wiring, MAF sensor
17576	P1168	Mass air flow (MAF) sensor, bank 2 – low input	Intake leak, air filter blocked, wiring short to earth, fuse, MAF sensor
17577	P1169	Mass air flow (MAF) sensor, bank 2 – high input	Wiring short to positive, earth wire defective, MAF sensor
17578	P1170	Mass air flow (MAF) sensor, bank 2 – supply voltage	Wiring, fuse, engine control relay, injector



**AUDI**

Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93→) • A4/S4  
100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**Engine management**

VAG type 5-digit	EOBD type	Fault location	Probable cause
17579	P1171	Throttle motor position sensor 2 – range/performance problem	Wiring, throttle valve tight/sticking, throttle motor position sensor
17580	P1172	Throttle motor position sensor 2 – low input	Wiring short to earth, throttle motor position sensor
17581	P1173	Throttle motor position sensor 2 – high input	Wiring short to positive, throttle motor position sensor
17582	P1174	Fuel measurement system, bank 1 – injection timing incorrect	Fuel pressure/pump, injector(s), intake/exhaust leak, EGR system, EVAP canister purge valve, HO2S
17584	P1176	Lambda correction after catalyst, bank 1 – control limit reached	Intake leak, HO2S
17585	P1177	Lambda correction after catalyst, bank 2 – control limit reached	Intake leak, HO2S
17586	P1178	Heated oxygen sensor (HO2S) 1, bank 1, pump current – open circuit	Wiring open circuit, HO2S
17587	P1179	Heated oxygen sensor (HO2S) 1, bank 1, pump current – short to earth	Wiring short to earth, HO2S
17588	P1180	Heated oxygen sensor (HO2S) 1, bank 1, pump current – short to positive	Wiring short to positive, HO2S
17589	P1181	Heated oxygen sensor (HO2S) 1, bank 1, reference voltage – open circuit	Wiring open circuit, HO2S, HT leads, spark plugs, misfire detection
17590	P1182	Heated oxygen sensor (HO2S) 1, bank 1, reference voltage – short to earth	Wiring short to earth, HO2S, HT leads, spark plugs, misfire detection
17591	P1183	Heated oxygen sensor (HO2S) 1, bank 1, reference voltage – short to positive	Wiring short to positive, HO2S, HT leads, spark plugs, misfire detection
17595	P1187	Heated oxygen sensor (HO2S) 1, bank 1 or 2 – circuit malfunction	Wiring, HO2S
17598	P1190	Heated oxygen sensor (HO2S) 1, bank 1, reference voltage – range/performance problem	Wiring, HO2S, HT leads, spark plugs, misfire detection
17599	P1191	Heated oxygen sensor (HO2S) 1, bank 1 & 2 – interchanged	HO2S 1 on banks 1 & 2 incorrectly installed
17600	P1192	Fuel pressure sensor – supply voltage	Wiring, fuel pressure sensor
17601	P1193	Fuel pressure sensor – open circuit/short to positive	Wiring open circuit/short to positive
17602	P1194	Fuel pressure control valve – short to positive	Wiring short to positive, fuel pressure control valve
17603	P1195	Fuel pressure control valve – open circuit/short to earth	Wiring open circuit/short to earth, fuel pressure control valve
17604	P1196	Heated oxygen sensor (HO2S) 1, bank 1, heater circuit malfunction	Wiring, HO2S
17605	P1197	Heated oxygen sensor (HO2S) 1, bank 2, heater circuit malfunction	Wiring, HO2S
17606	P1198	Heated oxygen sensor (HO2S) 2, bank 1, heater circuit malfunction	Wiring, HO2S
17607	P1199	Heated oxygen sensor (HO2S) 2, bank 2, heater circuit malfunction	Wiring, HO2S
17609	P1201	Injector 1 – circuit malfunction	Wiring, injector

Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93 →) • A4/S4  
100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**AUDI**



Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
17610	P1202	Injector 2 – circuit malfunction	Wiring, injector
17611	P1203	Injector 3 – circuit malfunction	Wiring, injector
17612	P1204	Injector 4 – circuit malfunction	Wiring, injector
17613	P1205	Injector 5 – circuit malfunction	Wiring, injector
17614	P1206	Injector 6 – circuit malfunction	Wiring, injector
17615	P1207	Injector 7 – circuit malfunction	Wiring, injector
17616	P1208	Injector 8 – circuit malfunction	Wiring, injector
17621	P1213	Injector 1 – short to positive	Wiring short to positive, injector
17622	P1214	Injector 2 – short to positive	Wiring short to positive, injector
17623	P1215	Injector 3 – short to positive	Wiring short to positive, injector
17624	P1216	Injector 4 – short to positive	Wiring short to positive, injector
17625	P1217	Injector 5 – short to positive	Wiring short to positive, injector
17626	P1218	Injector 6 – short to positive	Wiring short to positive, injector
17627	P1219	Injector 7 – short to positive	Wiring short to positive, injector
17628	P1220	Injector 8 – short to positive	Wiring short to positive, injector
17633	P1225	Injector 1 – short to earth	Wiring short to earth, injector
17634	P1226	Injector 2 – short to earth	Wiring short to earth, injector
17635	P1227	Injector 3 – short to earth	Wiring short to earth, injector
17636	P1228	Injector 4 – short to earth	Wiring short to earth, injector
17637	P1229	Injector 5 – short to earth	Wiring short to earth, injector
17638	P1230	Injector 6 – short to earth	Wiring short to earth, injector
17639	P1231	Injector 7 – short to earth	Wiring short to earth, injector
17640	P1232	Injector 8 – short to earth	Wiring short to earth, injector
17645	P1237	Injector 1 – open circuit	Wiring open circuit, injector
17646	P1238	Injector 2 – open circuit	Wiring open circuit, injector
17647	P1239	Injector 3 – open circuit	Wiring open circuit, injector
17648	P1240	Injector 4 – open circuit	Wiring open circuit, injector
17649	P1241	Injector 5 – open circuit	Wiring open circuit, injector
17650	P1242	Injector 6 – open circuit	Wiring open circuit, injector
17651	P1243	Injector 7 – open circuit	Wiring open circuit, injector
17652	P1244	Injector 8 – open circuit	Wiring open circuit, injector
17653	P1245	Injector needle lift sensor – short to earth	Wiring short to earth, injector needle lift sensor
17654	P1246	Injector needle lift sensor – range/ performance problem	Injector needle lift sensor, injector pipe defective, fuel level low
17655	P1247	Injector needle lift sensor – open circuit/ short to positive	Wiring open circuit/short to positive, injector needle lift sensor
17656	P1248	Start of injection – control difference	Fuel injection timing solenoid, injector needle lift sensor, fuel level low, pump timing
17658	P1250	Fuel tank level sensor – low input	Fuel level too low
17659	P1251	Fuel injection timing solenoid – short to positive	Wiring short to positive



**AUDI**

Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93 →) • A4/S4  
100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**Engine management**

<b>VAG type 5-digit</b>	<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
17660	P1252	Fuel injection timing solenoid – open circuit/short to earth	Wiring open circuit/short to earth, fuel injection timing solenoid
17661	P1253	Instrument panel, fuel consumption signal – short to earth	Wiring short to earth, instrument panel
17662	P1254	Instrument panel, fuel consumption signal – short to positive	Wiring short to positive, instrument panel
17663	P1255	Engine coolant temperature (ECT) sensor – short to earth	Wiring short to earth, ECT sensor
17664	P1256	Engine coolant temperature (ECT) sensor – open circuit/short to positive	Wiring open circuit/short to positive, ECT sensor
17668	P1260	Injector 1 – implausible signal	No control
17669	P1261	Injector 1 – control limit exceeded	Control period too long, wiring, injector
17670	P1262	Injector 1 – control limit not reached	Control period too short, fuel level low, air in fuel system
17671	P1263	Injector 2 – implausible signal	No control
17672	P1264	Injector 2 – control limit exceeded	Control period too long, wiring, injector
17673	P1265	Injector 2 – control limit not reached	Control period too short, fuel level low, air in fuel system
17674	P1266	Injector 3 – implausible signal	No control
17675	P1267	Injector 3 – control limit exceeded	Control period too long, wiring, injector
17676	P1268	Injector 3 – control limit not reached	Control period too short, fuel level low, air in fuel system
17677	P1269	Injector 4 – implausible signal	No control
17678	P1270	Injector 4 – control limit exceeded	Control period too long, wiring, injector
17679	P1271	Injector 4 – control limit not reached	Control period too short, fuel level low, air in fuel system
17686	P1278	Fuel metering solenoid – short to positive	Wiring short to positive, fuel metering solenoid
17687	P1279	Fuel metering solenoid – open circuit/short to earth	Wiring open circuit/short to earth, fuel metering solenoid
17689	P1281	Fuel metering solenoid – short to earth	Wiring short to earth, fuel metering solenoid
17690	P1282	Fuel metering solenoid – open circuit	Wiring open circuit, fuel metering solenoid
17695	P1287	Turbocharger (TC) bypass valve – open circuit	Wiring open circuit, TC bypass valve
17696	P1288	Turbocharger (TC) bypass valve – short to positive	Wiring short to positive, TC bypass valve
17697	P1289	Turbocharger (TC) bypass valve – short to earth	Wiring short to earth, TC bypass valve
17698	P1290	Engine coolant temperature (ECT) sensor, ECM controlled cooling system – high input	Wiring, ECT sensor
17699	P1291	Engine coolant temperature (ECT) sensor, ECM controlled cooling system – high input	Wiring, ECT sensor
17700	P1292	Engine coolant thermostat – open circuit	Wiring open circuit, engine coolant thermostat
17701	P1293	Engine coolant thermostat – short to positive	Wiring short to positive, engine coolant thermostat
17702	P1294	Engine coolant thermostat – short to earth	Wiring short to earth, engine coolant thermostat

Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93 →) • A4/S4  
100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**AUDI**



## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
17703	P1295	Turbocharger (TC), bypass – flow malfunction	TC wastegate regulating valve, hose connection(s), injector
17704	P1296	Engine cooling system – malfunction	ECT sensor, coolant thermostat
17705	P1297	Turbocharger (TC)/throttle valve, hose connection – pressure loss	Hose connection
17707	P1299	Fuel metering solenoid – circuit malfunction	Wiring, fuel metering solenoid
17708	P1300	Random/multiple cylinder(s) – misfire detected	Fuel level low, fuel gauge tank sensor
17733	P1325	Knock control, cylinder 1 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17734	P1326	Knock control, cylinder 2 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17735	P1327	Knock control, cylinder 3 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17736	P1328	Knock control, cylinder 4 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17737	P1329	Knock control, cylinder 5 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17738	P1330	Knock control, cylinder 6 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17739	P1331	Knock control, cylinder 7 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17740	P1332	Knock control, cylinder 8 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17743 ■	P1335	Engine torque control – limit reached	Throttle control unit, hose(s), TC system, MAP sensor, IAT sensor, MAF sensor, ECT sensor
17744 ■	P1336	Engine torque monitoring – control limit exceeded	Hose(s), TC system, throttle control unit, IAT sensor, MAP sensor, MAF sensor, ECT sensor, APP sensor
17745	P1337	Camshaft position (CMP) sensor, bank 1 – short to earth	Wiring short to earth, CMP sensor
17746	P1338	Camshaft position (CMP) sensor, bank 1 – open circuit/short to positive	Wiring open circuit/short to positive, CMP sensor
17747	P1339	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – interchanged	Multi-plugs incorrectly connected
17748	P1340	Camshaft position (CMP) sensor 1/ bank 1/crankshaft position (CKP) sensor – out of sequence	Valve timing, CKP/CMP sensor installation, CKP sensor rotor
17749	P1341	Ignition amplifier, primary circuit 1 – short to earth	Wiring short to earth, ignition amplifier, CMP sensor, HT leads, spark plugs

**AUDI**

Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93 →) • A4/S4  
 100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
 Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**Engine management**

VAG type 5-digit	EOBD type	Fault location	Probable cause
17750	P1342	Ignition amplifier, primary circuit 1 – short to positive	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17751	P1343	Ignition amplifier, primary circuit 2 – short to earth	Wiring short to earth, ignition amplifier, CMP sensor, HT leads, spark plugs
17752	P1344	Ignition amplifier, primary circuit 2 – short to positive	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17753	P1345	Ignition amplifier, primary circuit 3 – short to earth	Wiring short to earth, ignition amplifier, CMP sensor, HT leads, spark plugs
17754	P1346	Ignition amplifier, primary circuit 3 – short to positive	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17755	P1347	Camshaft position (CMP) sensor 2/ bank 2/crankshaft position (CKP) sensor – out of sequence	Valve timing, CKP/CMP sensor installation, CKP sensor rotor
17756	P1348	Ignition amplifier, primary circuit 1 – open circuit	Wiring short to earth, ignition amplifier, CMP sensor, HT leads, spark plugs
17757	P1349	Ignition amplifier, primary circuit 2 – open circuit	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17758	P1350	Ignition amplifier, primary circuit 3 – open circuit	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17759	P1351	Camshaft position (CMP) sensor, bank 1 – range/performance problem	Ignore trouble code, erase fault memory
17762	P1354	Fuel quantity adjuster position sensor	Wiring, fuel injection pump
17763	P1355	Ignition coil/amplifier, cylinder 1 – open circuit	Wiring open circuit, ignition coil/amplifier
17764	P1356	Ignition coil/amplifier, cylinder 1 – short to positive	Wiring short to positive, ignition coil/amplifier
17765	P1357	Ignition coil/amplifier, cylinder 1 – short to earth	Wiring short to earth, ignition coil/amplifier
17766	P1358	Ignition coil/amplifier, cylinder 2 – open circuit	Wiring open circuit, ignition coil/amplifier
17767	P1359	Ignition coil/amplifier, cylinder 2 – short to positive	Wiring short to positive, ignition coil/amplifier
17768	P1360	Ignition coil/amplifier, cylinder 2 – short to earth	Wiring short to earth, ignition coil/amplifier
17769	P1361	Ignition coil/amplifier, cylinder 3 – open circuit	Wiring open circuit, ignition coil/amplifier
17770	P1362	Ignition coil/amplifier, cylinder 3 – short to positive	Wiring short to positive, ignition coil/amplifier
17771	P1363	Ignition coil/amplifier, cylinder 3 – short to earth	Wiring short to earth, ignition coil/amplifier
17772	P1364	Ignition coil/amplifier, cylinder 4 – open circuit	Wiring open circuit, ignition coil/amplifier
17773	P1365	Ignition coil/amplifier, cylinder 4 – short to positive	Wiring short to positive, ignition coil/amplifier
17774	P1366	Ignition coil/amplifier, cylinder 4 – short to earth	Wiring short to earth, ignition coil/amplifier
17775	P1367	Ignition coil/amplifier, cylinder 5 – open circuit	Wiring open circuit, ignition coil/amplifier



Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93→) • A4/S4  
100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**AUDI**



## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
17776	P1368	Ignition coil/amplifier, cylinder 5 – short to positive	Wiring short to positive, ignition coil/amplifier
17777	P1369	Ignition coil/amplifier, cylinder 5 – short to earth	Wiring short to earth, ignition coil/amplifier
17778	P1370	Ignition coil/amplifier, cylinder 6 – open circuit	Wiring open circuit, ignition coil/amplifier
17779	P1371	Ignition coil/amplifier, cylinder 6 – short to positive	Wiring short to positive, ignition coil/amplifier
17780	P1372	Ignition coil/amplifier, cylinder 6 – short to earth	Wiring short to earth, ignition coil/amplifier
17781	P1373	Ignition coil/amplifier, cylinder 7 – open circuit	Wiring open circuit, ignition coil/amplifier
17782	P1374	Ignition coil/amplifier, cylinder 7 – short to positive	Wiring short to positive, ignition coil/amplifier
17783	P1375	Ignition coil/amplifier, cylinder 7 – short to earth	Wiring short to earth, ignition coil/amplifier
17784	P1376	Ignition coil/amplifier, cylinder 8 – open circuit	Wiring open circuit, ignition coil/amplifier
17785	P1377	Ignition coil/amplifier, cylinder 8 – short to positive	Wiring short to positive, ignition coil/amplifier
17786	P1378	Ignition coil/amplifier, cylinder 8 – short to earth	Wiring short to earth, ignition coil/amplifier
17793	P1385	Engine control module (ECM) – defective	ECM
17794	P1386	Engine control module (ECM), knock control – defective	ECM
17795	P1387	Engine control module (ECM), BARO sensor – defective	ECM
17796	P1388	Engine control module (ECM), ETS – defective	ECM
17797	P1389	Engine control module (ECM) 2 – defective	ECM
17799	P1391	Camshaft position (CMP) sensor 2/ bank 2 – short to earth	Wiring short to earth, CMP sensor
17800	P1392	Camshaft position (CMP) sensor 2/ bank 2 – open circuit/short to positive	Wiring open circuit/short to positive, CMP sensor
17801	P1393	Ignition amplifier, primary circuit 1 – circuit malfunction	Wiring, ignition amplifier, HT leads, spark plugs
17802	P1394	Ignition amplifier, primary circuit 2 – circuit malfunction	Wiring, ignition amplifier, HT leads, spark plugs
17803	P1395	Ignition amplifier, primary circuit 3 – circuit malfunction	Wiring, ignition amplifier, HT leads, spark plugs
17805	P1397	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – control limit reached	Insecure/damaged rotor, CKP/RPM sensor
17806	P1398	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – short to earth	Wiring short to earth, CKP/RPM sensor
17807	P1399	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – short to positive	Wiring short to positive, CKP/RPM sensor
17808	P1400	Exhaust gas recirculation (EGR) valve/ solenoid, bank 1 – circuit malfunction	Wiring, EGR valve



**AUDI**

Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93 →) • A4/S4  
100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**Engine management**

<b>VAG type 5-digit</b>	<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
17809	P1401	Exhaust gas recirculation (EGR) valve/solenoid, bank 1 – short to earth	Wiring short to earth, EGR valve
17810	P1402	Exhaust gas recirculation (EGR) valve/solenoid, bank 1 – short to positive	Wiring short to positive, EGR valve/solenoid
17811	P1403	Exhaust gas recirculation (EGR) system – control difference	Basic setting not carried out, EGR system
17812	P1404	Exhaust gas recirculation (EGR) system – basic setting	Basic setting not carried out, EGR system
17815	P1407	Exhaust gas recirculation temperature (EGRT) sensor – low input	Wiring short to earth, EGRT sensor
17816	P1408	Exhaust gas recirculation temperature (EGRT) sensor – high input	Wiring short to positive, earth wire defective, EGRT sensor
17817	P1409	Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring, EVAP canister purge valve
17818	P1410	Evaporative emission (EVAP) canister purge valve – short to positive	Wiring short to positive, EVAP canister purge valve
17819	P1411	Secondary air injection (AIR) system, bank 2 – insufficient flow detected	Intake leak, hose(s) blocked/leaking, AIR valve/solenoid
17822	P1414	Secondary air injection (AIR) system, bank 2 – leak detected	Intake leak, hose(s) leaking, AIR valve/solenoid
17823	P1415	Exhaust gas recirculation (EGR) valve position sensor – lower limit exceeded	Basic setting not carried out
17824	P1416	Exhaust gas recirculation (EGR) valve position sensor – upper limit exceeded	Basic setting not carried out
17828	P1420	Secondary air injection (AIR) valve/solenoid – circuit malfunction	Wiring, AIR solenoid
17829	P1421	Secondary air injection (AIR) valve/solenoid – short to earth	Wiring short to earth, AIR valve/solenoid
17830	P1422	Secondary air injection (AIR) valve/solenoid – short to positive	Wiring short to positive, AIR valve/solenoid
17831	P1423	Secondary air injection (AIR) system, bank 1 – insufficient flow detected	Hose connection(s), AIR valve/solenoid
17832	P1424	Secondary air injection (AIR) system, bank 1 – leak detected	AIR valve, exhaust leak
17833	P1425	Evaporative emission (EVAP) canister purge valve – short to earth	Wiring short to earth, EVAP canister purge valve
17834	P1426	Evaporative emission (EVAP) canister purge valve – open circuit	Wiring open circuit, EVAP canister purge valve
17835	P1427	Vacuum pump, brakes – short to positive	Wiring short to positive, vacuum pump
17836	P1428	Vacuum pump, brakes – short to earth	Wiring short to earth, vacuum pump
17837	P1429	Vacuum pump, brakes – open circuit	Wiring open circuit, vacuum pump
17838	P1430	Vacuum pump, brakes – open circuit/short to positive	Wiring open circuit/short to positive, vacuum pump
17839	P1431	Vacuum pump, brakes – open circuit/short to earth	Wiring open circuit/short to earth, vacuum pump
17840	P1432	Secondary air injection (AIR) valve/solenoid – open circuit	Wiring open circuit, fuse, AIR valve/solenoid




VAG type 5-digit	EOBD type	Fault location	Probable cause
17841	P1433	Secondary air injection (AIR) pump relay – open circuit	Wiring open circuit, fuse, AIR pump relay
17842	P1434	Secondary air injection (AIR) pump relay – short to positive	Wiring short to positive, AIR pump relay
17843	P1435	Secondary air injection (AIR) pump relay – short to earth	Wiring short to earth, AIR pump relay
17844	P1436	Secondary air injection (AIR) pump relay – circuit malfunction	Wiring, AIR pump relay
17845	P1437	Exhaust gas recirculation (EGR) valve/solenoid, bank 2 – short to positive	Wiring short to positive, EGR valve/solenoid
17846	P1438	Exhaust gas recirculation (EGR) valve/solenoid, bank 2 – open circuit/short to earth	Wiring open circuit/short to earth, EGR valve/solenoid
17847	P1439	Exhaust gas recirculation (EGR) valve position sensor – basic setting	Basic setting not carried out, EGR system
17848	P1440	Exhaust gas recirculation (EGR) valve – open circuit	Wiring open circuit, EGR valve
17849	P1441	Exhaust gas recirculation (EGR) valve/solenoid, bank 1 – open circuit/short to earth	Wiring open circuit/short to earth, EGR solenoid
17850	P1442	Exhaust gas recirculation (EGR) valve position sensor – high input	Wiring short to positive, EGR valve position sensor
17851	P1443	Exhaust gas recirculation (EGR) valve position sensor – low input	Wiring short to earth, EGR valve position sensor
17852	P1444	Exhaust gas recirculation (EGR) valve position sensor – range/performance problem	Wiring, EGR valve position sensor
17858	P1450	Secondary air injection (AIR) system – short to positive	Wiring short to positive, AIR relay
17859	P1451	Secondary air injection (AIR) system – short to earth	Wiring short to earth, AIR relay
17860	P1452	Secondary air injection (AIR) system – open circuit	Wiring open circuit, AIR relay
17861	P1453	Exhaust gas recirculation temperature (EGRT) sensor 1/bank 1 – open circuit/short to positive	Wiring open circuit/short to positive, EGRT sensor
17862	P1454	Exhaust gas recirculation temperature (EGRT) sensor 1/bank 1 – short to earth	Wiring short to earth, EGRT sensor
17863	P1455	Exhaust gas recirculation temperature (EGRT) sensor 1/bank 1 – range/performance problem	Exhaust leak, wiring, EGRT sensor
17864	P1456	Exhaust gas recirculation temperature (EGRT) control, bank 1 – control limit reached	EGRT sensor
17865	P1457	Exhaust gas recirculation temperature (EGRT) sensor 2/bank 2 – open circuit/short to positive	Wiring open circuit/short to positive, EGRT sensor
17866	P1458	Exhaust gas recirculation temperature (EGRT) sensor 2/bank 2 – short to earth	Wiring short to earth, EGRT sensor



**AUDI**

Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93 →) • A4/S4  
 100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
 Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**Engine management**

VAG type 5-digit	EOBD type	Fault location	Probable cause
17867	P1459	Exhaust gas recirculation temperature (EGRT) sensor 2/bank 2 – range/performance problem	Exhaust leak, wiring, EGRT sensor
17868	P1460	Exhaust gas recirculation temperature (EGRT) control, bank 2 – control limit reached	EGRT sensor
17869	P1461	Exhaust gas recirculation temperature (EGRT) control, bank 1 – range/performance problem	Exhaust leak/blockage, EGRT sensor
17870	P1462	Exhaust gas recirculation temperature (EGRT) control, bank 2 – range/performance problem	Exhaust leak/blockage, EGRT sensor
17887	P1479	Vacuum system, brakes – mechanical fault	Vacuum pump
17908	P1500	Fuel pump relay – circuit malfunction	Wiring, fuel pump relay
17909	P1501	Fuel pump relay – short to earth	Wiring short to earth, fuel pump relay
17910	P1502	Fuel pump relay – short to positive	Wiring short to positive, fuel pump relay
17911	P1503	Alternator load signal	Wiring, alternator
17912 	P1504	Intake system – leak detected	Intake leak, EGR system, EVAP system, hose connection(s), throttle control unit
17913	P1505	Closed throttle position (CTP) switch – does not close	Throttle cable/valve, wiring open circuit/short to positive, CTP switch adjustment/defective, ECM
17914	P1506	Closed throttle position (CTP) switch – does not open	Moisture ingress, wiring short to earth, CTP switch adjustment/defective, ECM
17915	P1507	Idle speed control (ISC) – lower limit reached	Throttle control unit/basic setting, intake/exhaust leak, mechanical fault, AC signals
17916	P1508	Idle speed control (ISC) – upper limit reached	Throttle control unit/basic setting, intake/exhaust leak, mechanical fault, AC signals
17917	P1509	Idle air control (IAC) valve – circuit malfunction	Wiring, IAC valve
17918	P1510	Idle air control (IAC) valve – short to positive	Wiring open circuit/short to positive, IAC valve
17919	P1511	Intake manifold air control solenoid 1 – current circuit	Wiring, intake manifold air control solenoid
17920	P1512	Intake manifold air control solenoid 1 – short to positive	Wiring short to positive, intake manifold air control solenoid
17921	P1513	Intake manifold air control solenoid 2 – short to positive	Wiring short to positive, intake manifold air control solenoid
17922	P1514	Intake manifold air control solenoid 2 – short to earth	Wiring short to earth, intake manifold air control solenoid
17923	P1515	Intake manifold air control solenoid 1 – short to earth	Wiring short to earth, intake manifold air control solenoid
17924	P1516	Intake manifold air control solenoid 1 – open circuit	Wiring open circuit, intake manifold air control solenoid
17925	P1517	Engine control relay – circuit malfunction	Wiring, engine control relay
17926	P1518	Engine control relay – short to positive	Wiring short to positive, engine control relay
17927	P1519	Camshaft position (CMP) control, bank 1 – malfunction	Cylinder head oil pressure too low, CMP actuator sticking/defective

Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93 →) • A4/S4  
100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**AUDI**



## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
17928	P1520	Intake manifold air control solenoid 2 – open circuit	Wiring open circuit, intake manifold air control solenoid
17930	P1522	Camshaft position (CMP) control, bank 2 – malfunction	Cylinder head oil pressure too low, CMP actuator sticking/defective
17931	P1523	SRS crash signal received	Airbag triggered
17932	P1524	Fuel pump relay – open circuit/short to earth	Wiring open circuit/short to earth, fuel pump relay
17933	P1525	Camshaft position (CMP) actuator, bank 1 – circuit malfunction	Wiring, CMP actuator
17934	P1526	Camshaft position (CMP) actuator, bank 1 – short to positive	Wiring short to positive, CMP actuator
17935	P1527	Camshaft position (CMP) actuator, bank 1 – short to earth	Wiring short to earth, CMP actuator
17936	P1528	Camshaft position (CMP) actuator, bank 1 – open circuit	Wiring open circuit, CMP actuator
17937	P1529	Camshaft position (CMP) actuator – short to positive	Wiring short to positive, CMP actuator
17938	P1530	Camshaft position (CMP) actuator – short to earth	Wiring short to earth, CMP actuator
17939	P1531	Camshaft position (CMP) actuator – open circuit	Wiring open circuit, CMP actuator
17940 ■	P1532	Idle control – lean running speed below specification	Throttle control unit
17941	P1533	Camshaft position (CMP) actuator, bank 2 – circuit malfunction	Wiring, CMP actuator
17942	P1534	Camshaft position (CMP) actuator, bank 2 – short to positive	Wiring short to positive, CMP actuator
17943	P1535	Camshaft position (CMP) actuator, bank 2 – short to earth	Wiring short to earth, CMP actuator
17944	P1536	Camshaft position (CMP) actuator, bank 2 – open circuit	Wiring open circuit, CMP actuator
17945	P1537	Fuel shut-off solenoid – malfunction	Fuel shut-off solenoid (leaking/sticking)
17946	P1538	Fuel shut-off solenoid – open circuit/short to earth	Wiring open circuit/short to earth, fuel shut-off solenoid
17947	P1539	Clutch pedal position (CPP) switch – range/performance problem	Wiring, CPP switch
17948	P1540	Vehicle speed signal – high input	Excessive vehicle speed, instrument panel defective
17949	P1541	Fuel pump relay – open circuit	Wiring open circuit, fuel pump relay
17950	P1542	Throttle motor position sensor 1 – range/performance problem	Throttle valve requires cleaning, wiring, throttle motor position sensor
17951	P1543	Throttle motor position sensor 1 – low input	Wiring short to earth, throttle motor position sensor
17952	P1544	Throttle motor position sensor 1 – high input	Wiring short to positive, throttle motor position sensor
17953 ■	P1545	Throttle valve control – malfunction	Throttle valve tight/sticking, wiring, throttle control unit



**AUDI**

Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93→) • A4/S4  
 100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
 Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**Engine management**

VAG type 5-digit	EOBD type	Fault location	Probable cause
17954	P1546	Turbocharger (TC) wastegate regulating valve – short to positive	Wiring short to positive, TC wastegate regulating valve
17955	P1547	Turbocharger (TC) wastegate regulating valve – short to earth	Wiring short to earth, TC wastegate regulating valve
17956	P1548	Turbocharger (TC) wastegate regulating valve – open circuit	Wiring open circuit, TC wastegate regulating valve
17957	P1549	Turbocharger (TC) wastegate regulating valve – open circuit/short to earth	Wiring open circuit/short to earth, TC wastegate regulating valve
17958	P1550	Turbocharger (TC) pressure – control difference	Intake/exhaust leak, hoses interchanged/not connected, MAP sensor, TC wastegate regulating valve, turbocharger (TC) wastegate actuator, TC
17961	P1553	Manifold absolute pressure (MAP) sensor/ barometric pressure (BARO) sensor – range/performance problem	Intake/exhaust leak, EGR system, EVAP canister purge valve, throttle control unit, wiring, MAP sensor, BARO sensor
17962	P1554	Throttle control unit – basic setting conditions	Basic setting conditions not met
17963	P1555	Turbocharger (TC) pressure – upper limit exceeded	Hoses interchanged/not connected, TC wastegate regulating valve, turbocharger (TC) wastegate actuator, TC
17964	P1556	Turbocharger (TC) pressure – control limit not reached	TC wastegate regulating valve, intake leak, TC defective
17965	P1557	Turbocharger (TC) pressure – control limit exceeded	Hose connection interchanged/not connected
17966	P1558	Idle speed control (ISC) actuator/throttle motor – circuit malfunction	Wiring, ISC actuator/throttle motor
17967	P1559	Throttle control unit – basic setting malfunction	Accelerator pedal or starter motor operated during basic setting
17968	P1560	Maximum engine RPM exceeded	Incorrect gear shift, wiring open circuit, CKP/RPM sensor
17969	P1561	Fuel quantity adjuster – control difference	Wiring, fuel injection pump
17970	P1562	Fuel quantity adjuster – upper stop value	Fuel quantity adjuster blocked/defective, stop value reached
17971	P1563	Fuel quantity adjuster – lower stop value	Fuel quantity adjuster blocked/defective, lower stop value reached
17972	P1564	Throttle control unit – voltage low during basic setting	Battery, wiring
17973	P1565	Throttle control unit – lower stop not reached	Throttle valve tight/sticking, ISC actuator
17974	P1566	AC compressor, load signal – implausible signal	Wiring, AC system
17976	P1568	Throttle control unit – mechanical fault	Throttle valve tight/sticking
17977	P1569	Cruise control master switch	Wiring, cruise control master switch
17978	P1570	Engine control module (ECM) – immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective
17979	P1571	Engine mounting control solenoid, bank 2 – short to positive	Wiring short to positive, engine mounting control solenoid
17980	P1572	Engine mounting control solenoid, bank 2 – short to earth	Wiring short to earth, engine mounting control solenoid

Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93 →) • A4/S4  
100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**AUDI**



## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
17981	P1573	Engine mounting control solenoid, bank 2 – open circuit	Wiring open circuit, engine mounting control solenoid
17983	P1575	Engine mounting control solenoid, bank 1 – short to positive	Wiring short to positive, engine mounting control solenoid
17984	P1576	Engine mounting control solenoid, bank 1 – short to earth	Wiring short to earth, engine mounting control solenoid
17985	P1577	Engine mounting control solenoid, bank 1 – open circuit	Wiring open circuit, engine mounting control solenoid
17987 ■	P1579	Throttle control unit – basic setting	Basic setting not carried out
17988	P1580	Throttle motor, bank 1 – circuit malfunction	Wiring, throttle motor
17989 ■	P1581	Throttle control unit – basic setting	Basic setting not carried out
17990	P1582	Idle speed adaptation – limit reached	Intake/exhaust leak, AIR system, fuel pressure/pump, injector(s), EVAP canister purge valve
17993 ■	P1585	Throttle control unit – lower stop not reached	Throttle motor, throttle control unit
17994	P1586	Engine mounting control solenoid, bank 1 & 2 – short to positive	Wiring short to positive, engine mounting control solenoid
17997	P1589	AC/heater air temperature control switch – short to earth	Wiring short to earth, AC/heater air temperature control switch
17998	P1590	AC/heater air temperature control switch – open circuit	Wiring open circuit, AC/heater air temperature control switch
18000 ■	P1592	Barometric pressure (BARO) sensor/ manifold absolute pressure (MAP) sensor – implausible ratio	TC system, MAP sensor
18001 ■	P1593	Altitude adaption – signal outside tolerance	Intake leak, MAF sensor, throttle control unit
18007	P1599	Idle control – lean running speed above specification	IAC valve
18008	P1600	Engine control module (ECM) – supply voltage low from ignition switch	Battery, alternator, wiring open circuit
18009	P1601	Engine control module (ECM) – supply voltage	Wiring, engine control relay
18010	P1602	Engine control module (ECM) – supply voltage low from battery	Battery was disconnected, battery discharged, alternator, wiring open circuit, fuse
18011	P1603	Engine control module (ECM) – defective	ECM
18012	P1604	Engine control module (ECM) – defective	ECM
18014	P1606	Rough road signal – circuit malfunction	ABS control module trouble code(s) stored, CAN data bus
18016	P1608	Power steering pressure (PSP) switch – circuit malfunction	Wiring, PSP switch
18017	P1609	Engine control module (ECM) – crash switch-off triggered	Airbag triggered
18018	P1610	Engine control module (ECM) – defective	ECM
18019	P1611	Malfunction indicator lamp (MIL) – short to earth	Wiring short to earth
18020	P1612	Engine control module (ECM) – coding	Incorrectly coded
18021	P1613	Malfunction indicator lamp (MIL) – open circuit/short to positive	Wiring open circuit/short to positive



**AUDI**

Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93 →) • A4/S4  
100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**Engine management**

<b>VAG type 5-digit</b>	<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
18023	P1615	Engine oil temperature (EOT) sensor – range/performance problem	Engine oil level, wiring, EOT sensor
18024	P1616	Glow plug warning lamp – short to positive	Wiring short to positive
18025	P1617	Glow plug warning lamp – open circuit/short to earth	Bulb, wiring open circuit/short to earth
18026	P1618	Glow plug relay – short to positive	Wiring short to positive, glow plug relay
18027	P1619	Glow plug relay – open circuit/short to earth	Wiring open circuit/short to earth, glow plug relay
18028	P1620	Instrument panel, ECT signal – open circuit/short to positive	Wiring open circuit/short to positive, instrument panel
18029	P1621	Instrument panel, ECT signal – short to earth	Wiring short to earth, instrument panel
18030	P1622	Instrument panel, ECT signal – implausible signal	Wiring, instrument panel, ECT sensor
18031	P1623	CAN data bus – no signal	Trouble code(s) stored in other system(s), wiring, matching resistor in ECM
18032	P1624	Malfunction indicator lamp (MIL) – request signal active	Trouble code(s) stored in other system(s)
18033	P1625	CAN data bus, TCM – incorrect signal	TCM trouble code(s) stored, TCM incorrectly coded, wiring, matching resistor in ECM
18034	P1626	CAN data bus, TCM – no signal	TCM trouble code(s) stored, TCM incorrectly coded, wiring, matching resistor in ECM
18037	P1629	CAN data bus, cruise control – no signal	Cruise control trouble code(s) stored, wiring, matching resistor in ECM
18038	P1630	Accelerator pedal position (APP) sensor 1 – low input	Wiring short to earth, APP sensor
18039	P1631	Accelerator pedal position (APP) sensor 1 – high input	Wiring short to positive, APP sensor
18040	P1632	Accelerator pedal position (APP) sensor – supply voltage	Operating voltage too high/low, wiring
18041	P1633	Accelerator pedal position (APP) sensor 2 – low input	Wiring short to earth, APP sensor
18042	P1634	Accelerator pedal position (APP) sensor 2 – high input	Wiring short to positive, APP sensor
18043	P1635	CAN data bus, AC – no signal	AC control module trouble code(s) stored, wiring, matching resistor in ECM
18044	P1636	CAN data bus, SRS – no signal	SRS control module trouble code(s) stored, wiring, matching resistor in ECM
18045	P1637	CAN data bus, electronic CE – no signal	Trouble code(s) stored, wiring, matching resistor in ECM
18047	P1639	Accelerator pedal position (APP) sensor 1/2 – range/performance problem	Wiring, APP sensor
18048	P1640	Engine control module (ECM) – defective	ECM
18050	P1642	SRS control module – system malfunction	Trouble code(s) stored
18053	P1645	CAN data bus, 4WD – no signal	4WD trouble code(s) stored, wiring, matching resistor in ECM
18056	P1648	CAN data bus – defective	Wiring, matching resistor in ECM



Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93 →) • A4/S4  
100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**AUDI**



## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
18057	P1649	CAN data bus, ABS – no signal	ABS control module trouble code(s) stored, wiring, matching resistor in ECM
18058	P1650	CAN data bus, instrumentation – no signal	Instrumentation control module trouble code(s) stored, wiring, matching resistor in ECM
18060	P1652	Transmission control module (TCM) – system malfunction	Trouble code(s) stored
18061	P1653	ABS control module – system malfunction	Trouble code(s) stored
18062	P1654	Instrumentation control module – system malfunction	Trouble code stored for engine oil level/temperature sensor
18064	P1656	AC signal – short to earth	Wiring short to earth
18065	P1657	AC signal – short to positive	Wiring
18066	P1658	CAN data bus, cruise control – incorrect signal	Cruise control trouble code(s) stored, wiring, matching resistor in ECM
18067	P1659	Engine coolant blower motor, speed 1 – short to positive	Wiring short to positive, engine coolant blower motor
18068	P1660	Engine coolant blower motor, speed 1 – short to earth	Wiring short to earth, engine coolant blower motor
18069	P1661	Engine coolant blower motor, speed 2 – short to positive	Wiring short to positive, engine coolant blower motor
18070	P1662	Engine coolant blower motor, speed 2 – short to earth	Wiring short to earth, engine coolant blower motor
18071	P1663	Injector, activation – short to positive	Wiring short to positive, ECM
18072	P1664	Injector, activation – current circuit	Wiring open circuit/short to earth
18073	P1665	Injector – mechanical fault	Injector
18074	P1666	Injector 1 – current circuit	Wiring open circuit/short to earth
18075	P1667	Injector 2 – current circuit	Wiring open circuit/short to earth
18076	P1668	Injector 3 – current circuit	Wiring open circuit/short to earth
18077	P1669	Injector 4 – current circuit	Wiring open circuit/short to earth
18080	P1672	Engine coolant blower motor, speed 1 – open circuit/short to earth	Wiring open circuit/short to earth
18082	P1674	CAN data bus, instrumentation – incorrect signal	Wiring, instrumentation control module trouble code(s) stored, matching resistor in ECM
18084	P1676	ETS warning lamp – circuit malfunction	Instrumentation control module trouble code(s) stored, wiring, matching resistor in ECM
18085	P1677	ETS warning lamp – short to positive	Instrumentation control module trouble code(s) stored, wiring short to positive, matching resistor in ECM
18086	P1678	ETS warning lamp – short to earth	Instrumentation control module trouble code(s) stored, wiring short to earth, matching resistor in ECM
18087	P1679	ETS warning lamp – open circuit	Instrumentation control module trouble code(s) stored, wiring open circuit, matching resistor in ECM
18088 ■	P1680	Limp-home mode – active	Throttle control unit, APP sensor
18089	P1681	Engine control module (ECM) – programming incomplete	ECM

**AUDI**

Model: A2 • A3/S3 • 80 1,6/2,0/2,6/2,8 • 80 1,9 TDI (07/93 →) • A4/S4  
100/A6 1,8/2,0/2,6/2,8/4,2 • A6 2,5 TDI • A6/S6/Allroad • A8/S8  
Coupé/Cabriolet 1,8/2,0/2,6/2,8 • Cabriolet 1,9 TDI • TT

**Engine management**

VAG type 5-digit	EOBD type	Fault location	Probable cause
18090	P1682	CAN data bus, ABS – implausible signal	ABS control module trouble code(s) stored, wiring, matching resistor in ECM
18091	P1683	CAN data bus, SRS – implausible signal	SRS control module trouble code(s) stored, wiring, matching resistor in ECM
18098	P1690	Malfunction indicator lamp (MIL) – circuit malfunction	Instrumentation control module trouble code(s) stored, wiring, matching resistor in ECM
18099	P1691	Malfunction indicator lamp (MIL) – open circuit	Instrumentation control module trouble code(s) stored, wiring open circuit, matching resistor in ECM
18100	P1692	Malfunction indicator lamp (MIL) – short to earth	Instrumentation control module trouble code(s) stored, wiring short to earth, matching resistor in ECM
18101	P1693	Malfunction indicator lamp (MIL) – short to positive	Instrumentation control module trouble code(s) stored, wiring short to positive, matching resistor in ECM
18104	P1696	CAN data bus, steering column electronics – incorrect signal	Wiring, matching resistor in ECM
18259	P1851	CAN data bus, ABS – incorrect signal	ABS trouble code(s) stored, wiring, matching resistor in ECM
18261	P1853	CAN data bus, ABS – incorrect signal	ABS trouble code(s) stored, wiring, matching resistor in ECM
18262	P1854	CAN data bus, ABS – defective	ABS trouble code(s) stored, wiring, matching resistor in ECM
18308	P1900	Engine coolant blower motor, speed 2 – open circuit/short to earth	Wiring open circuit/short to earth, engine coolant blower motor
18309	P1901	Engine coolant blower motor run-on relay – short to positive	Wiring short to positive, engine coolant blower motor run-on relay
18310	P1902	Engine coolant blower motor run-on relay – open circuit/short to earth	Wiring open circuit/short to earth, engine coolant blower motor run-on relay
18311	P1903	Engine coolant hydraulic blower motor solenoid – short to positive	Wiring short to positive, engine coolant hydraulic blower motor solenoid
18312	P1904	Engine coolant hydraulic blower motor solenoid – open circuit/short to earth	Wiring open circuit/short to earth, engine coolant hydraulic blower motor solenoid
18313	P1905	Charge air coolant pump relay – short to positive	Wiring short to positive, charge air coolant pump relay
18314	P1906	Charge air coolant pump relay – open circuit/short to earth	Wiring open circuit/short to earth, charge air coolant pump relay
18315	P1907	Data bus, ECM 1/2 – defective	Wiring
18316	P1908	Data bus, ECM 1/2 – software version monitoring	Data in ECM 1 & ECM 2 does not match
18317	P1909	Data bus, ECM 1/2 – no signal from ECM 1	Wiring, ECM 1
18318	P1910	Data bus, ECM 1/2 – no signal from ECM 2	Wiring, ECM 2
18318	P1911	Data bus, ECM 1/2 – circuit malfunction	Wiring, ECM 1/2
18320	P1912	Brake servo pressure sensor – open circuit/short to positive	Wiring open circuit/short to positive, brake servo pressure sensor
18321	P1913	Brake servo pressure sensor – short to earth	Wiring short to earth, brake servo pressure sensor



VAG type 5-digit	EOBD type	Fault location	Probable cause
18322	P1914	Brake servo pressure sensor – range/performance problem	Vacuum leak, wiring, brake servo pressure sensor
18328	P1920	Engine mounting control solenoid, bank 1 & 2 – open circuit/short to earth	Wiring open circuit/short to earth, engine mounting control solenoid
18331	P1923	Engine control module (ECM) 2 – malfunction	Trouble code(s) stored
19456	P3000	CAN data bus, instrumentation – glow plug warning lamp	Wiring, matching resistor in ECM
19458	P3002	Accelerator pedal position (APP) sensor – transmission kick-down switch	APP sensor
19459	P3003	Engine coolant heater relay 1, low output	Wiring, engine coolant heater relay
19461	P3005	Engine coolant heater relay 2, high output	Wiring, engine coolant heater relay
19463	P3007	Camshaft position (CMP) sensor – no signal	Air gap, insecure sensor/rotor, wiring, CMP sensor
19464	P3008	Camshaft position (CMP) sensor – signal limit exceeded	Insecure rotor, camshaft alignment
19465	P3009	Fuel cooling pump relay – short to positive	Wiring short to positive, fuel cooling pump relay
19466	P3010	Fuel cooling pump relay – open circuit/short to earth	Wiring open circuit/short to earth, fuel cooling pump relay
19467	P3011	Fuel pump relay – short to positive	Wiring short to positive, fuel pump relay
19468	P3012	Fuel pump relay – open circuit/short to earth	Wiring open circuit/short to earth, fuel pump relay
19469	P3013	Turbocharger (TC) wastegate regulating valve B – short to positive	Wiring short to positive, TC wastegate regulating valve
19470	P3014	Turbocharger (TC) wastegate regulating valve B – open circuit/short to earth	Wiring open circuit/short to earth, TC wastegate regulating valve
19471	P3015	Fuel bypass valve – short to positive	Wiring short to positive, fuel bypass valve
19472	P3016	Fuel bypass valve – open circuit/short to earth	Wiring open circuit/short to earth, fuel bypass valve
19496	P3040	Gear ratio – implausible	Transmission fault
19497	P3041	CAN data bus, instrumentation – implausible ECT signal	Wiring, matching resistor in ECM
19560	P3104	Intake manifold air control solenoid – short to positive	Wiring short to positive, intake manifold air control solenoid
19561	P3105	Intake manifold air control solenoid – open circuit/short to earth	Wiring open circuit/short to earth, intake manifold air control solenoid
19717	P3262	Heated oxygen sensor (HO2S) 2, bank 1 & 2 – interchanged	HO2S 2 on bank 1 & 2 incorrectly installed
65280	–	CAN data bus, ABS – defective	ABS trouble code(s) stored, wiring, matching resistor in ECM
65535	–	Engine control module (ECM) – defective	ECM

- 1 Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.
- 2 Located at rear of exhaust camshaft.
- 3 Throttle control unit incorporates the following components: TP sensor, CTP switch (if fitted), ISC actuator/position sensor or throttle motor/position sensor.
- 4 May also produce HT voltage for cylinder 4.
- 5 May also produce HT voltage for cylinder 3.
- 6 Incorporates heated oxygen sensor (HO2S) 2.



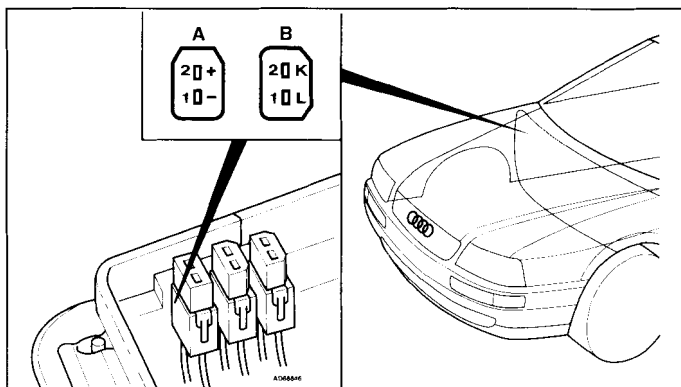


# AUDI

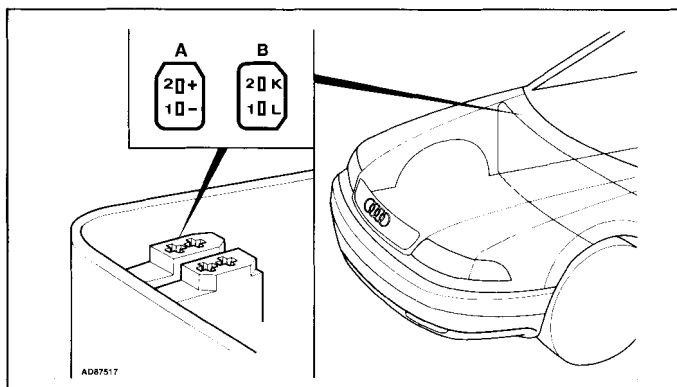
Model: 80 1,6/2,0 • 100/A6 2,0  
 Year: 1991-07/92  
 Engine code: AAE, ABM, ABT  
 System: Bosch Mono-Motronic MA1.2.1

## Engine management

### Data link connector (DLC) locations



80 – in underbonnet fusebox/relay plate



100/A6 – in underbonnet relay plate

### Trouble codes

NOTE: 35 pin ECM multi-plug.

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Self-diagnosis using flash type trouble codes may not display all available diagnostic information.
- Carry out road test for 10 minutes.

- Repeat switch operation. Note trouble codes. Compare with trouble code table.
- End of test sequence indicated by trouble code 0000 (long flashes).
- Switch ignition OFF. Rectify faults as necessary.

#### Accessing

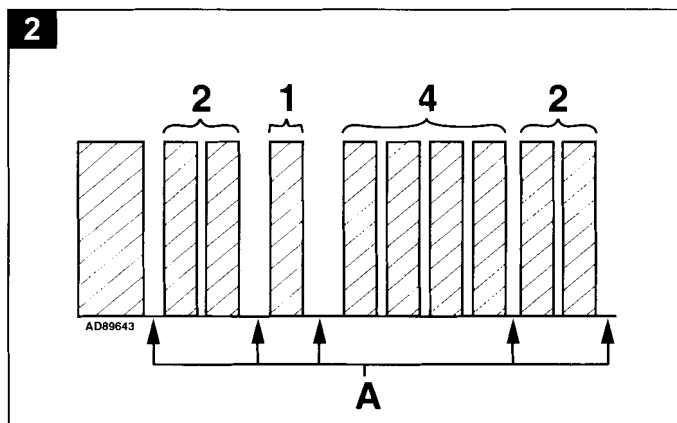
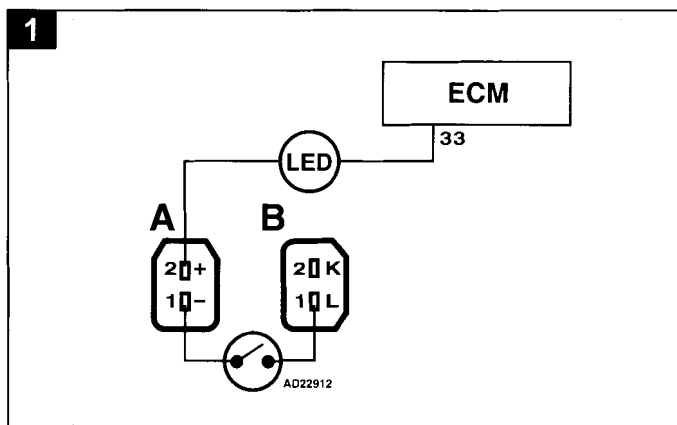
- Ensure ignition switched OFF.
- Bridge black data link connector (DLC) terminal 1 [A] and brown or white data link connector (DLC) terminal 1 [B] with a switched lead – contacts normally open.
- Connect LED test lamp between black data link connector (DLC) terminal 2 [A] and ECM terminal 33.
- 80: ECM located behind passenger's glovebox.
- 100: ECM located in plenum chamber.

NOTE: **DO NOT disconnect ECM multi-plug as this will erase fault memory.**

- Start engine. Allow to idle.

NOTE: **If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.**

- Operate switch for 4 seconds.
- Release switch. Check that LED flashes.
- Count LED flashes. Note trouble code.
- Each trouble code consists of four groups of one to four flashes.
- A 2,5 second pause separates each trouble code group [2] [A].





## Erasing

## Method 1

- Ensure ignition switched OFF.
- Bridge black data link connector (DLC) terminal 1 **1** [A] and brown or white data link connector (DLC) terminal 1 [B] with a switched lead – contacts normally open.
- Operate switch and hold.
- Switch ignition ON.
- Release switch after 5 seconds.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

## Method 2

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug or battery earth lead.

**NOTE:** *ECM adaptive memory may be erased causing erratic running faults. Carry out road test to allow ECM to re-learn basic values.*

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

## Trouble code identification

Flash type 4-digit	Fault location	Probable cause
0000	End of test sequence	–
1111	Engine control module (ECM)	ECM
1231	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
1232	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
2113 <b>1</b>	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
2212	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
2234	Engine control module (ECM) – supply voltage	Battery, wiring
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2322	Intake air temperature (IAT) sensor	Wiring, IAT sensor
2341 <b>2</b>	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
2342	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
2413 <b>2</b>	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
4444	No fault found	–

**1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.

**2** After repairs, erase learnt lambda control values: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.

**AUDI**

Model: 80 1,6/2,0 • 100/A6 2,0

**Engine management**

<b>VAG type 5-digit</b>	<b>Fault location</b>	<b>Probable cause</b>
00000	No fault found	—
00281	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00282	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
00515 <b>1</b>	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
00516	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
00518	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	Intake air temperature (IAT) sensor	Wiring, IAT sensor
00524	Knock sensor (KS)	Wiring, KS
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
00532	Engine control module (ECM) – supply voltage	Battery, wiring
00537 <b>2</b>	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
00561 <b>2</b>	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
00670	Idle speed control (ISC) actuator position sensor	Wiring, throttle valve, ISC actuator position sensor
17978	Engine control module (ECM) immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective
65535	Engine control module (ECM)	ECM

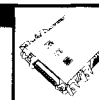
**1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.

**2** After repairs, erase learnt lambda control values: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.



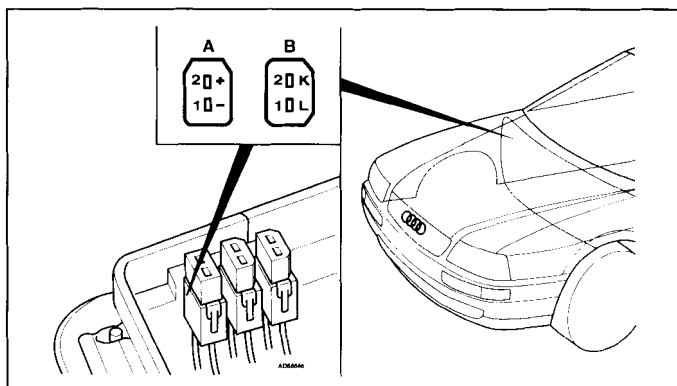
Model: 80 1,6/2,0 • 100/A6 2,0  
 Year: 1992-97  
 Engine code: AAE, ABM, ABT  
 System: Bosch Mono-Motronic MA1.2.3

**AUDI**

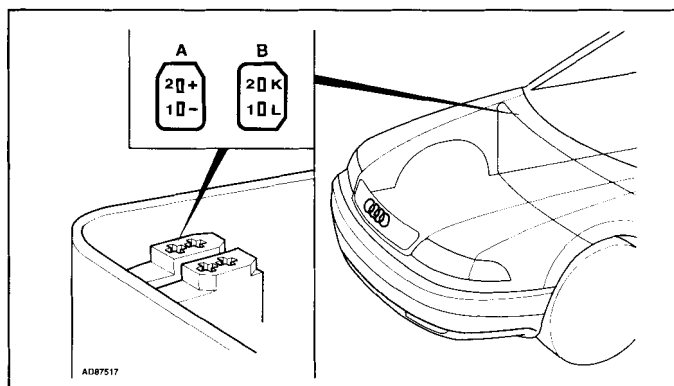


## Engine management

### Data link connector (DLC) locations



80 – in underbonnet fusebox/relay plate



100/A6 – in underbonnet relay plate

### Trouble codes

**NOTE:** 45 pin ECM multi-plug.

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Carry out road test for at least 10 minutes.
- If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.

#### Accessing

- The engine control module (ECM) fault memory can only be accessed using diagnostic equipment connected to the data link connector (DLC).

**NOTE:** Brown or white data link connector (DLC) terminal 1 is not connected to ECM terminal 11.

#### Erasing

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug or battery earth lead.

**NOTE:** ECM adaptive memory may be erased causing erratic running faults. Carry out road test to allow ECM to re-learn basic values.

- Diagnostic equipment can also be used to erase data from ECM fault memory.

**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).

### Trouble code identification

Flash type 4-digit	Fault location	Probable cause
0000	End of test sequence	—
1111	Engine control module (ECM)	ECM
1231	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
1232	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
2113 ■	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
2212	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
2234	Engine control module (ECM) – supply voltage	Battery, wiring
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor

**AUDI**

Model: 80 1,6/2,0 • 100/A6 2,0

## Engine management

Flash type 4-digit	Fault location	Probable cause
2322	Intake air temperature (IAT) sensor	Wiring, IAT sensor
2341 <b>2</b>	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
2342	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
2413 <b>2</b>	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
4444	No fault found	–

**1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.

**2** After repairs, erase learnt lambda control values: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.

VAG type 5-digit	Fault location	Probable cause
00000	No fault found	–
00281	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00282	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
00515 <b>1</b>	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
00516	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
00518	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	Intake air temperature (IAT) sensor	Wiring, IAT sensor
00524	Knock sensor (KS)	Wiring, KS
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
00532	Engine control module (ECM) – supply voltage	Battery, wiring
00537 <b>2</b>	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
00561 <b>2</b>	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
00670	Idle speed control (ISC) actuator position sensor	Wiring, throttle valve, ISC actuator position sensor
17978	Engine control module (ECM) immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective
65535	Engine control module (ECM)	ECM

**1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.

**2** After repairs, erase learnt lambda control values: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.





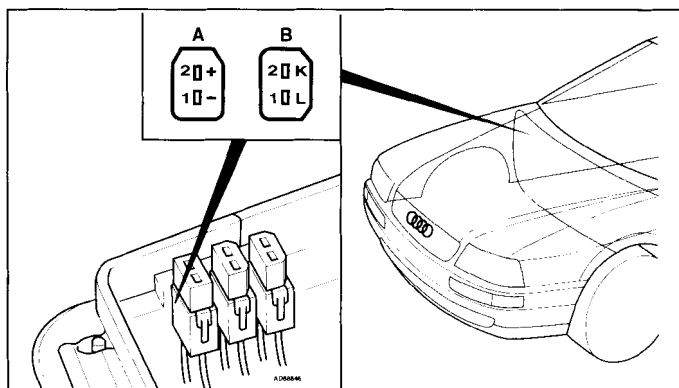
Model: 80 1,9 TDI (→06/93) • 100 2,5 TDI  
 Year: 1990-94  
 Engine code: 1T, 1Z, AAT, ABP  
 System: Bosch EDC 1.2.3 • Bosch EDC 1.2.4  
 Bosch EDC 1.2.6 • Bosch EDC 1.2.9

**AUDI**

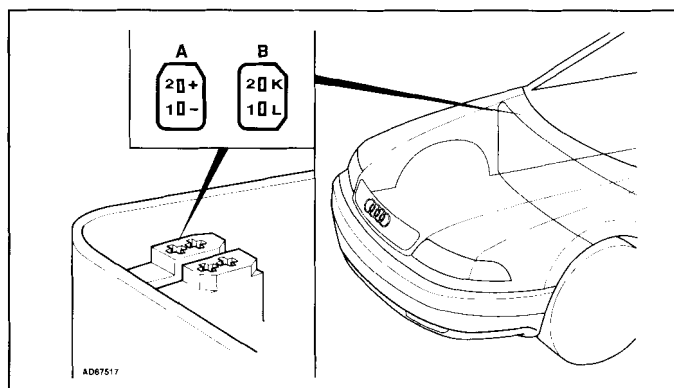


## Engine management

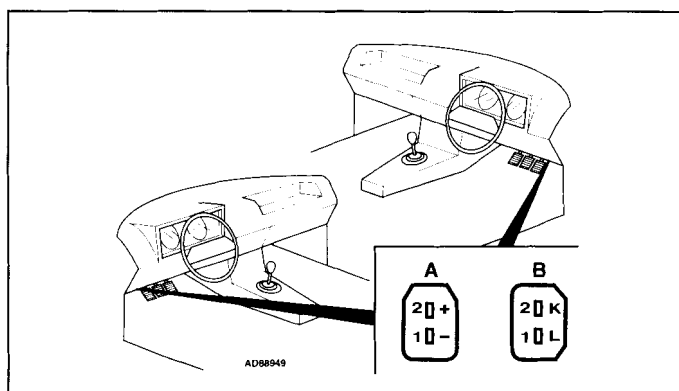
### Data link connector (DLC) locations



80 – in underbonnet fusebox/relay plate



100 1991 → – in underbonnet relay plate



100 →1991 – under fascia, driver's side

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Self-diagnosis using flash type trouble codes may not display all available diagnostic information.

#### Accessing

- Ensure ignition switched OFF.
- Bridge black data link connector (DLC) terminal 1 **[A]** and brown data link connector (DLC) terminal 1 **[B]** with a switched lead – contacts normally open.

- Start engine. Allow to idle.

**NOTE:** If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.

- Operate switch for 4 seconds minimum.
- Release switch. Check that MIL flashes.
- Count MIL flashes. Note trouble code.
- Each trouble code consists of four groups of one to four flashes.
- A 2,5 second pause separates each trouble code group **2** **[A]**.
- Repeat switch operation. Note trouble codes. Compare with trouble code table.

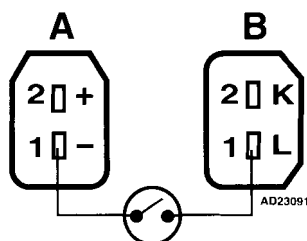
**NOTE:** Maximum of 5 trouble codes can be stored by memory at one time.

- End of test sequence indicated by trouble code 0000 (long flashes).
- Switch ignition OFF. Rectify faults as necessary.



## Engine management

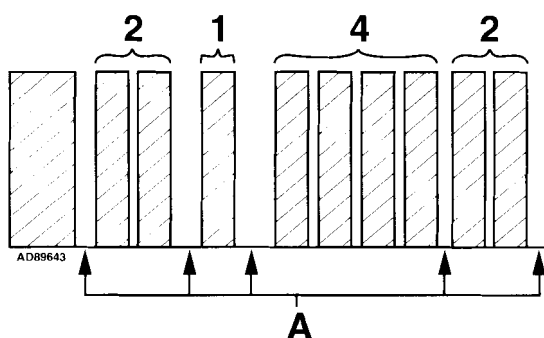
1



### Erasing

- Ensure ignition switched OFF.
- Bridge black data link connector (DLC) terminal 1 **1** [A] and brown data link connector (DLC) terminal 1 **1** [B] with a switched lead – contacts normally open.
- Access trouble codes until flash code 4444 displayed.
- Operate switch for 4 seconds minimum.
- Release switch. Switch ignition OFF.
- Operate switch and hold.
- Switch ignition ON.
- Release switch after 4 seconds minimum to display flash code 4444.
- Operate switch for 4 seconds minimum. Fault memory erased.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

2



### Trouble code identification

Flash type 4-digit	Fault location	Probable cause
1111	Engine control module (ECM) – defective	ECM
1231	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
2111	Crankshaft position (CKP) sensor	Air gap, metal particles, insecure sensor/rotor, wiring, CKP sensor
2131	Stop lamp switch/brake pedal position (BPP) switch – implausible ratio	Wiring, both switch positions not synchronised, stop lamp switch, BPP switch
2211	Injector needle lift sensor	Air in fuel system, fuel level low, wiring, CKP sensor, injector needle lift sensor
2213	Fuel quantity adjuster position sensor	Wiring, fuel quantity adjuster position sensor
2221	Intake manifold pressure	Intake leak/blockage, MAP sensor, MAF sensor, TC wastegate actuator/regulating valve, hoses interchanged/not connected, wiring
2222	Manifold absolute pressure (MAP) sensor	TC wastegate regulating valve, hose connection(s), poor connection, wiring, MAP sensor, ECM
2234	Engine control module (ECM) – supply voltage	Fuse, alternator, battery, current draw with ignition OFF, engine control relay, wiring
2244	Start of injection – control	Wiring, fuel injection timing solenoid, injector needle lift sensor, air in fuel system, fuel level low, pump timing



Flash type 4-digit	Fault location	Probable cause
2311	Fuel temperature sensor	Fuel filter pre-heater, fuel filter non-return valve, wiring, fuel temperature sensor
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2322	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
3131	Accelerator pedal position (APP) sensor	Incorrectly adjusted, wiring, APP sensor
4113	Fuel quantity adjuster	Incorrectly set, wiring, fuel injection pump
4312	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid
4321	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid
4332	Engine control module (ECM) – output stages	Wiring, ECM controlled components
4444	No fault found	–

VAG type 5-digit	Fault location	Probable cause
00281	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00513	Crankshaft position (CKP) sensor	Air gap, metal particles, insecure sensor/rotor, wiring, CKP sensor
00519	Manifold absolute pressure (MAP) sensor	TC wastegate regulating valve, hose connection(s), poor connection, wiring, MAP sensor, ECM
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
00526	Stop lamp switch/brake pedal position (BPP) switch – implausible ratio	Wiring, both switch positions not synchronised, stop lamp switch, BPP switch
00527	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
00532	Engine control module (ECM) – supply voltage	Fuse, alternator, battery, current draw with ignition OFF, engine control relay, wiring
00539	Fuel temperature sensor	Fuel filter pre-heater, fuel filter non-return valve, wiring, fuel temperature sensor
00541	Fuel quantity adjuster position sensor	Wiring, fuel quantity adjuster position sensor
00542	Injector needle lift sensor	Air in fuel system, fuel level low, wiring, CKP sensor, injector needle lift sensor
00550	Start of injection – control	Wiring, fuel injection timing solenoid, injector needle lift sensor, air in fuel system, fuel level low, pump timing
00552	Volume air flow (VAF) sensor	Intake leak, EGR system hose connections interchanged, wiring, VAF sensor
00560	Exhaust gas recirculation (EGR) system	Hose connection(s), wiring, EGR solenoid/valve
00575	Intake manifold pressure	Intake leak/blockage, MAP sensor, MAF sensor, TC wastegate actuator/regulating valve, hoses interchanged/not connected, wiring
00625	Vehicle speed signal	Wiring, speedometer, VSS
00627	Fuel filter water level sensor	Water in filter, wiring, fuel filter water level sensor



**AUDI**

Model: 80 1,9 TDI (→06/93) • 100 2,5 TDI

**Engine management**

<b>VAG type 5-digit</b>	<b>Fault location</b>	<b>Probable cause</b>
00668	Engine control module (ECM) – supply voltage low	Battery, wiring, engine control relay
00671	Cruise control master switch	Wiring, cruise control master switch
00741	Stop lamp switch/brake pedal position (BPP) switch – implausible ratio	Wiring, both switch positions not synchronised, stop lamp switch, BPP switch
00765	Fuel quantity adjuster position sensor	Wiring, fuel injection pump
00777	Accelerator pedal position (APP) sensor	Incorrectly adjusted, wiring, APP sensor
00819	Engine control module (ECM) – supply voltage	Wiring, engine control relay
01054	Engine control module (ECM) – supply voltage	Wiring, engine control relay
01117	Alternator load signal	Wiring, alternator
01237	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid
01242	Engine control module (ECM) – output stages	Wiring, ECM controlled components
01265	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid
01268	Fuel quantity adjuster	Incorrectly set, wiring, fuel injection pump
65535	Engine control module (ECM) – defective	ECM



Model: 80 2,0 16V • 100 2,0 • 100/A6 2,0 16V  
Coupe 2,0 16V

Year: 1991-97

Engine code: 6A, AAD, ACE

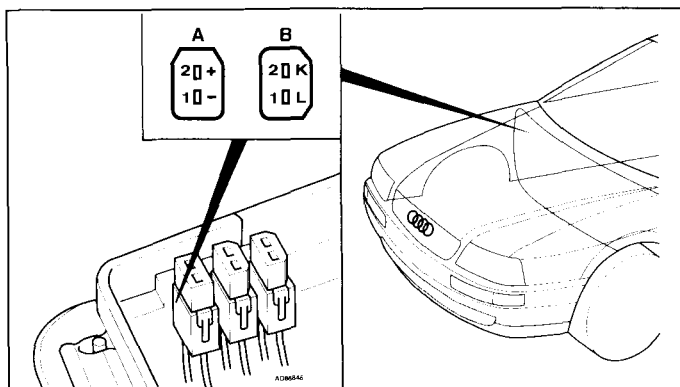
System: Bosch KE Motronic 1.2/1.2.1/1.2.2

**AUDI**

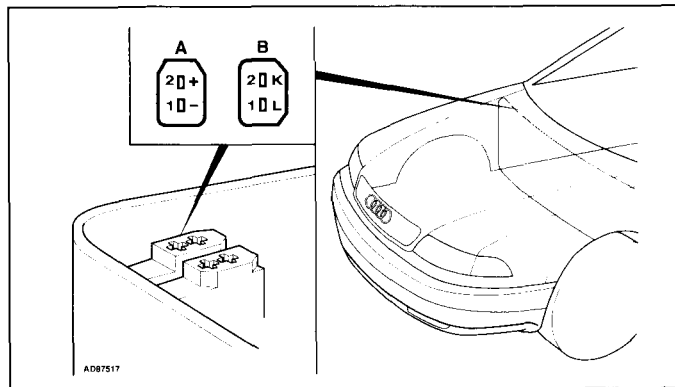


Engine management

## Data link connector (DLC) locations



80, Coupé – in underbonnet fusebox/relay plate



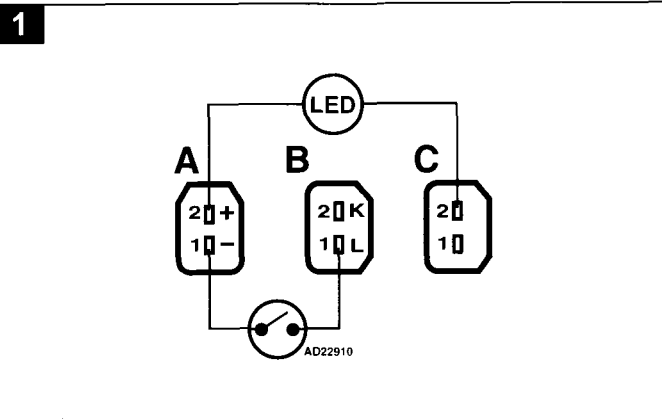
100, A6 – in underbonnet relay plate

## Trouble codes

### General information

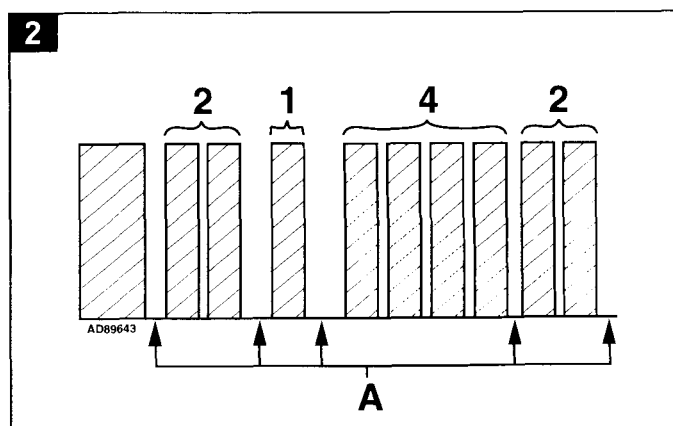
- ❑ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ❑ Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- ❑ The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- ❑ Self-diagnosis using flash type trouble codes may not display all available diagnostic information.
- ❑ Carry out road test for at least 5 minutes.
- ❑ Briefly fully depress throttle pedal to increase engine speed over 3000 rpm.
- ❑ Allow to idle for 2 minutes.
- ❑ If engine does not start: Crank engine for 6 seconds.

- End of test sequence indicated by trouble code 0000 (long flashes).
- Switch ignition OFF. Rectify faults as necessary.



### Accessing

- Ensure ignition switched OFF.
- Connect LED test lamp between black data link connector (DLC) terminal 2 **1** [A] and blue data link connector (DLC) terminal 2 **1** [C].
- Bridge black data link connector (DLC) terminal 1 **1** [A] and brown/white data link connector (DLC) terminal 1 **1** [B] with a switched lead – contacts normally open.
- Switch ignition ON.
- Operate switch for 4-6 seconds.
- Release switch. Check that LED flashes.
- Count LED flashes. Note trouble code.
- Each trouble code consists of four groups of one to four flashes.
- A 2,5 second pause separates each trouble code group **2** [A].
- Repeat switch operation. Note trouble codes. Compare with trouble code table.





## Engine management

### Erasing

- Ensure ignition switched OFF.
- Connect LED test lamp between black data link connector (DLC) terminal 2 **1** [A] and blue data link connector (DLC) terminal 2 **1** [C].
- Bridge black data link connector (DLC) terminal 1 **1** [A] and brown/white/yellow data link connector (DLC) terminal 1 **1** [B] with a switched lead – contacts normally open.
- Access trouble codes. Switch ignition OFF.
- Operate switch. Switch ignition ON after 4-6 seconds.
- Release switch after 4-6 seconds. Check that LED flashes.
- Differential pressure regulator activated. Trouble code displayed: 4341.
- Operate switch for 4-6 seconds to activate each of the following components:
- Evaporative emission (EVAP) canister purge valve. Trouble code displayed: 4343.
- Idle air control (IAC) valve. Trouble code displayed: 4431.
- Cold start injector. Trouble code displayed: 4443.
- After activation of last component operate switch for 4-6 seconds to display flash code 0000 (long flashes).
- Operate switch for 4-6 seconds to erase fault memory.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

### Trouble code identification

Flash type 4-digit	Fault location	Probable cause
0000	End of test sequence	–
1111	Engine control module (ECM)	ECM
1231	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
2112	Camshaft position (CMP) sensor, cylinder 4 HT lead	CMP sensor tabs not facing towards distributor, spark plug(s), HT lead(s), distributor cap/rotor, wiring, CMP sensor
2113	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor, volume air flow (VAF) sensor plate tight/sticking
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, throttle valve tight/sticking, wiring, CTP switch
2123	Wide open throttle (WOT) switch	Accelerator cable adjustment, wiring, WOT switch
2141	Knock control – control limit exceeded	Incorrect fuel/compression, ignition timing, screening of KS wiring, insecure engine component
2142	Knock sensor (KS) 1	Wiring, KS, ECM
2144	Knock sensor (KS) 2	Wiring, KS, ECM
2231	Idle speed control	Ignition timing, EVAP canister purge valve 1/2, intake leak, VAF sensor, throttle valve adjustment, AC signal missing, wiring
2232	Volume air flow (VAF) sensor	Wiring, VAF sensor
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2341	Heated oxygen sensor (HO2S) – lambda control	Mixture adjustment, HO2S heater/wiring, cold start injector, EVAP canister purge valve, intake/exhaust leak, ECM earth wire to intake manifold
2342	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative
4431	Idle air control (IAC) valve	Wiring, IAC valve, ECM
4444	No fault found	–



VAG type 5-digit	Fault location	Probable cause
00000	No fault found	–
00281	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00514	Camshaft position (CMP) sensor, cylinder 4 HT lead	CMP sensor tabs not facing towards distributor, spark plug(s), HT lead(s), distributor cap/rotor, wiring, CMP sensor
00515	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor, volume air flow (VAF) sensor plate tight/sticking
00516	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, throttle valve tight/sticking, wiring, CTP switch
00517	Wide open throttle (WOT) switch	Accelerator cable adjustment, wiring, WOT switch
00520	Volume air flow (VAF) sensor	Wiring, VAF sensor
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00524	Knock sensor (KS) 1	Wiring, KS, ECM
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative
00533	Idle speed control	Ignition timing, EVAP canister purge valve 1/2, intake leak, VAF sensor, throttle valve adjustment, AC signal missing, wiring
00535	Knock control – control limit exceeded	Incorrect fuel/compression, ignition timing, screening of KS wiring, insecure engine component
00537	Heated oxygen sensor (HO2S) – lambda control	Mixture adjustment, HO2S heater/wiring, cold start injector, EVAP canister purge valve, intake/exhaust leak, ECM earth wire to intake manifold
00540	Knock sensor (KS) 2	Wiring, KS, ECM
00558	Mixture control (MC) – mixture lean	ECM earth wire to intake manifold, intake leak, idle speed adjustment
00559	Mixture control (MC) – mixture rich	Injector(s), cold start injector, idle speed adjustment
00587	Mixture control (MC)	ECM earth wire to intake manifold, intake leak, idle speed adjustment, injector(s), cold start injector, EVAP canister purge valve
01257	Idle air control (IAC) valve	Wiring, IAC valve, ECM
17978	Engine control module (ECM) – immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective
65535	Engine control module (ECM)	ECM

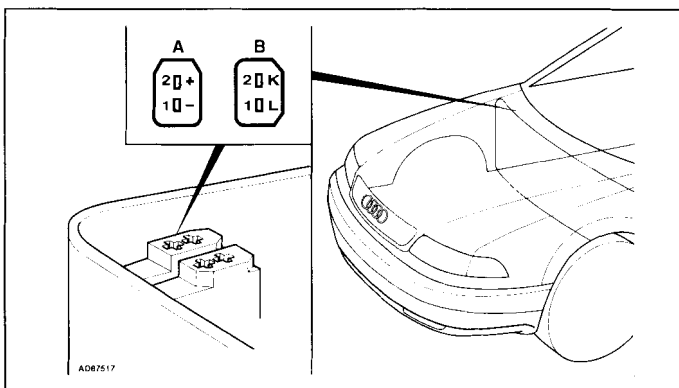


**AUDI**

Model: S6 2,2  
Year: 1994-96  
Engine code: AAN  
System: Bosch Motronic M2.3 • Bosch Motronic M2.3.2

## Engine management

### Data link connector (DLC) locations



In underbonnet relay plate

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing

- The engine control module (ECM) fault memory can only be accessed using diagnostic equipment connected to the data link connector (DLC).

#### Erasing

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug or battery earth lead.

**NOTE:** *ECM adaptive memory may be erased causing erratic running faults. Carry out road test to allow ECM to re-learn basic values.*

- Diagnostic equipment can also be used to erase data from ECM fault memory.

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

#### Trouble code identification

Flash type 4-digit	Fault location	Probable cause
0000	End of test sequence	—
1111	Engine control module (ECM) – defective	ECM
1231	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
2111	Engine speed (RPM) sensor	Air gap, metal particles, insecure sensor, flywheel ring gear damaged, wiring, CKP/RPM sensor multi-plugs interchanged, RPM sensor
2112	Crankshaft position (CKP) sensor	Air gap, metal particles, insecure sensor, flywheel pin bent/missing, wiring, CKP/RPM sensor multi-plugs interchanged, CKP sensor
2113	Camshaft position (CMP) sensor	Valve timing, distributor alignment, wiring, CMP sensor, CKP sensor flywheel pin bent/missing, CMP sensor
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, throttle valve tight/sticking, wiring, CTP switch





Flash type 4-digit	Fault location	Probable cause
2141	Knock control – control limit exceeded	Poor quality fuel, CKP/RPM sensor wiring, insecure engine component, KS shield wiring
2142	Knock sensor (KS) 1	Wiring, KS loose/defective, ECM
2144	Knock sensor (KS) 2	Wiring, KS loose/defective, ECM
2212	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
2214	Maximum engine RPM exceeded	Incorrect gear shift, AT fault
2222	Manifold absolute pressure (MAP) sensor	Hose leak/blockage, hose fluid collector full, TC wastegate regulating valve, MAP sensor (in ECM)
2223	Barometric pressure (BARO) sensor	Wiring, BARO sensor
2224	Maximum boost pressure exceeded	Hoses interchanged/not connected, hoses blocked/leaking, TC wastegate actuator/regulating valve, MAP sensor (in ECM)
2231	Idle speed control (ISC)	Intake leak/blockage, wiring, IAC valve, MAF sensor, throttle valve tight/sticking
2234	Engine control module (ECM) – supply voltage	Alternator, battery, current draw with ignition OFF, wiring
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2314	ECM/TCM electrical connection	TCM trouble code(s) stored, wiring, transmission fault
2322	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
2324	Mass air flow (MAF) sensor	Intake leak, wiring, MAF sensor
2341	Heated oxygen sensor (HO2S) – lambda control	Fuel level low, fuel pressure/pump, misfire, intake/exhaust leak, wiring, HO2S
2342	Heated oxygen sensor (HO2S)	Intake/exhaust leak, wiring, HO2S, heating inoperative, fuel level low, misfire
2413	Mixture control (MC)	Fuel pressure/pump, misfire, intake/exhaust leak, MAF sensor
4343	Evaporative emission (EVAP) canister purge valve	Wiring, fuse, EVAP canister purge valve
4411	Injector 1	Wiring, fuse, injector
4412	Injector 2	Wiring, fuse, injector
4413	Injector 3	Wiring, fuse, injector
4414	Injector 4	Wiring, fuse, injector
4421	Injector 5	Wiring, fuse, injector
4431	Idle air control (IAC) valve	Wiring, fuse, IAC valve
4442	Turbocharger (TC) wastegate regulating valve	Wiring, fuse, TC wastegate regulating valve
4444	No fault found	–



**AUDI**

Model: S6 2,2

## Engine management

VAG type 5-digit	Fault location	Probable cause
00000	No fault found	-
00281	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00513	Engine speed (RPM) sensor	Air gap, metal particles, insecure sensor, flywheel ring gear damaged, wiring, CKP/RPM sensor multi-plugs interchanged, RPM sensor
00514	Crankshaft position (CKP) sensor	Air gap, metal particles, insecure sensor, flywheel pin bent/missing, wiring, CKP/RPM sensor multi-plugs interchanged, CKP sensor
00515	Camshaft position (CMP) sensor	Valve timing, distributor alignment, wiring, CMP sensor, CKP sensor flywheel pin bent/missing, CMP sensor
00516	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, throttle valve tight/sticking, wiring, CTP switch
00518	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00519	Manifold absolute pressure (MAP) sensor	Hose leak/blockage, hose fluid collector full, TC wastegate regulating valve, MAP sensor (in ECM)
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
00524	Knock sensor (KS) 1	Wiring, KS loose/defective, ECM
00525	Heated oxygen sensor (HO2S)	Intake/exhaust leak, wiring, HO2S, heating inoperative, fuel level low, misfire
00528	Barometric pressure (BARO) sensor	Wiring, BARO sensor
00532	Engine control module (ECM) – supply voltage	Alternator, battery, current draw with ignition OFF, wiring
00533	Idle speed control (ISC)	Intake leak/blockage, wiring, IAC valve, MAF sensor, throttle valve tight/sticking
00537	Heated oxygen sensor (HO2S) – lambda control	Fuel level low, fuel pressure/pump, misfire, intake/exhaust leak, wiring, HO2S
00540	Knock sensor (KS) 2	Wiring, KS loose/defective, ECM
00543	Maximum engine RPM exceeded	Incorrect gear shift, AT fault
00544	Maximum boost pressure exceeded	Hoses interchanged/not connected, hoses blocked/leaking, TC wastegate actuator/regulating valve, MAP sensor (in ECM)
00545	ECM/TCM electrical connection	TCM trouble code(s) stored, wiring, transmission fault
00553	Mass air flow (MAF) sensor	Intake leak, wiring, MAF sensor
00561	Mixture control (MC)	Fuel pressure/pump, misfire, intake/exhaust leak, MAF sensor
00577	Knock control, cylinder 1 – control limit exceeded	Poor quality fuel, CKP/RPM sensor wiring, insecure engine component, KS shield wiring
00578	Knock control, cylinder 2 – control limit exceeded	Poor quality fuel, CKP/RPM sensor wiring, insecure engine component, KS shield wiring
00579	Knock control, cylinder 3 – control limit exceeded	Poor quality fuel, CKP/RPM sensor wiring, insecure engine component, KS shield wiring



VAG type 5-digit	Fault location	Probable cause
00580	Knock control, cylinder 4 – control limit exceeded	Poor quality fuel, CKP/RPM sensor wiring, insecure engine component, KS shield wiring
00581	Knock control, cylinder 5 – control limit exceeded	Poor quality fuel, CKP/RPM sensor wiring, insecure engine component, KS shield wiring
01247	Evaporative emission (EVAP) canister purge valve	Wiring, fuse, EVAP canister purge valve
01249	Injector 1	Wiring, fuse, injector
01250	Injector 2	Wiring, fuse, injector
01251	Injector 3	Wiring, fuse, injector
01252	Injector 4	Wiring, fuse, injector
01253	Injector 5	Wiring, fuse, injector
01257	Idle air control (IAC) valve	Wiring, fuse, IAC valve
01262	Turbocharger (TC) wastegate regulating valve	Wiring, fuse, TC wastegate regulating valve
17978	Engine control module (ECM) – immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective



**AUDI**

Model:

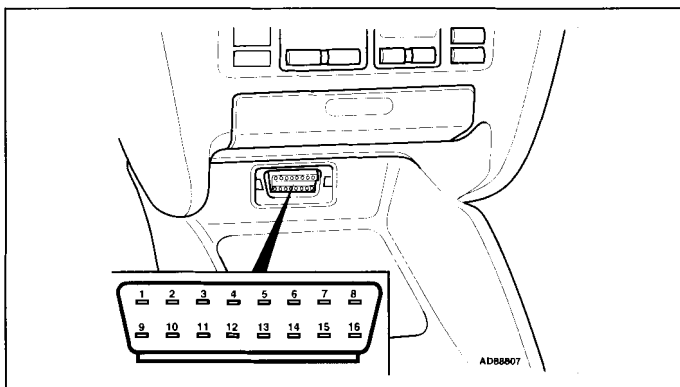
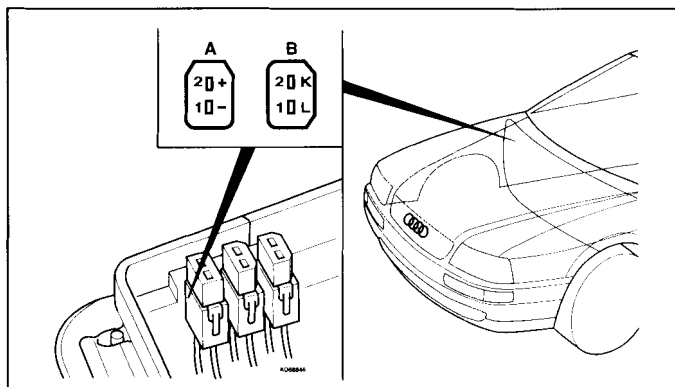
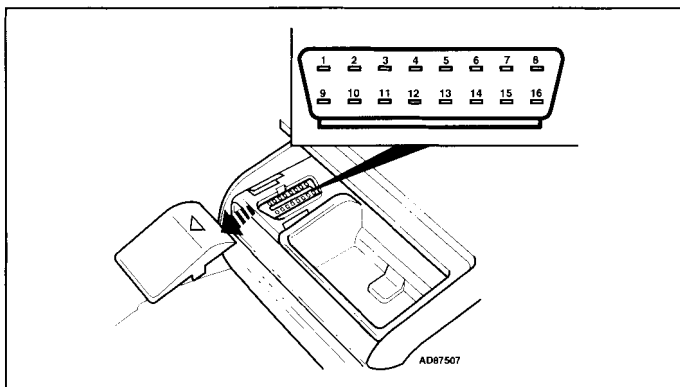
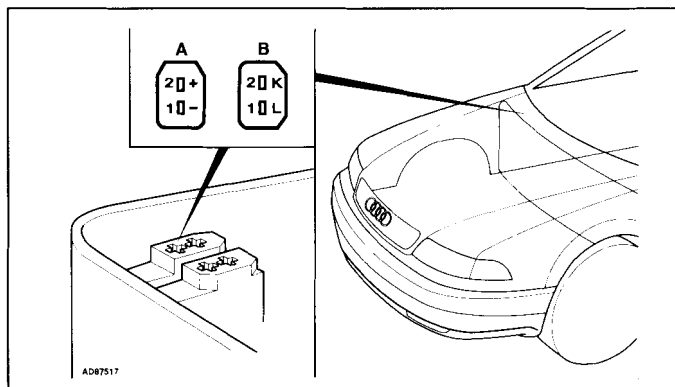
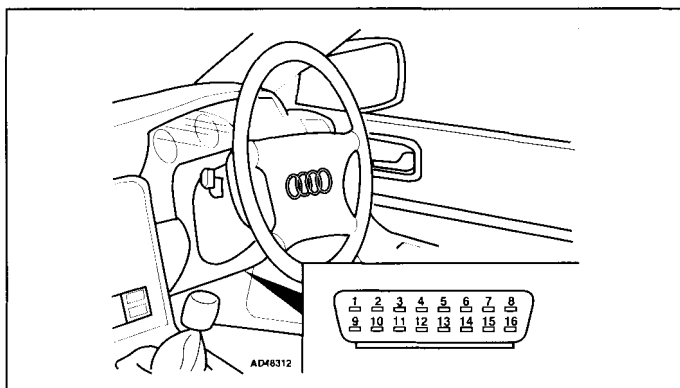
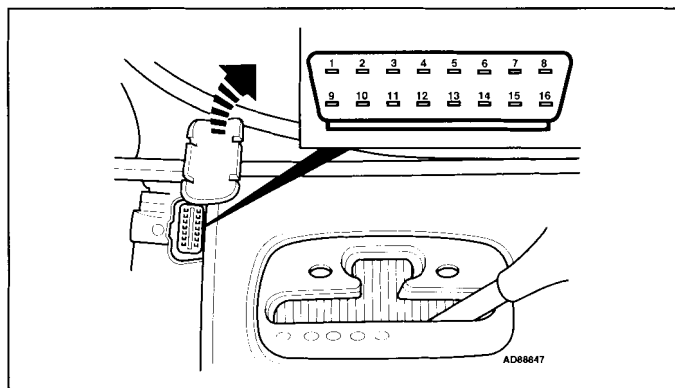
A3 • 80 • A4 • 100/A6 • A6/Allroad • A8

Coupé • Cabriolet

Year:

1991-02

Transmission

**Data link connector (DLC) locations****A3 – centre console****80, Coupé, Cabriolet – in underbonnet fusebox/relay plate****A4 →2000 – centre console, rear****100/A6 →1997 – in underbonnet relay plate****A4 2000 →, A6/Allroad 1997 → – fascia, driver's side****A8 – under front ashtray**



## Trouble codes

### 4motion – manual 5/6 speed 4WD

NOTE: Vehicle equipped with an electronically controlled Haldex coupling.

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The four wheel drive control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

VAG type	Fault location	Probable cause
00000	No fault found	–
00453	Haldex coupling – overheating	Mechanical fault
00526	Stop lamp switch	Wiring, stop lamp switch
00532	Four wheel drive control module – supply voltage	Alternator, battery, wiring
01043	Four wheel drive control module – programming	Incorrect four wheel drive control module
01155	Haldex coupling – mechanical fault	Mechanical fault
01312	CAN data bus – defective	Trouble code(s) stored in other system(s), wiring
01314	CAN data bus, ECM	Wiring, ECM trouble code(s) stored, ECM incorrectly coded, wiring
01316	CAN data bus, ABS	ABS control module trouble code(s) stored, wiring
65535	Four wheel drive control module – defective	Four wheel drive control module

### Automatic/Tiptronic

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Automatic transmission in 'P'.
- Data link connector (DLC) – 2-pin: (A) black, (B) brown/white.

#### Accessing and erasing

- The transmission control module (TCM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**AUDI**Model: A3 • 80 • A4 • 100/A6 • A6/Allroad • A8 • Coupé  
Cabriolet**Transmission****Trouble code identification**

VAG type	P type	Fault location	Probable cause
–	P0	Refer to EOBD trouble code table	–
00000	–	No fault found	–
00258	–	Solenoid valve 1	Wiring, poor connection, transmission internal wiring, solenoid valve
00260	–	Solenoid valve 2	Wiring, poor connection, transmission internal wiring, solenoid valve
00262	–	Solenoid valve 3	Wiring, poor connection, transmission internal wiring, solenoid valve
00263	–	Transmission	Wiring, hydraulic fault, clutch/valve body
00264	–	Solenoid valve 4	Wiring, poor connection, transmission internal wiring, solenoid valve
00266	–	Solenoid valve 5	Wiring, poor connection, transmission internal wiring, solenoid valve
00268	–	Solenoid valve 6	Wiring, poor connection, transmission internal wiring, solenoid valve
00270	–	Solenoid valve 7	Wiring, poor connection, transmission internal wiring, solenoid valve
00281	–	Vehicle speed sensor (VSS)	Wiring, speedometer, insecure rotor, VSS
00283	–	ABS control module, LH front wheel speed signal – range/performance problem	Wiring, ABS trouble code(s) stored, incorrect ABS control module
00285	–	ABS control module, RH front wheel speed signal – range/performance problem	Wiring, ABS trouble code(s) stored, incorrect ABS control module
00287	–	ABS control module, RH rear wheel speed signal – range/performance problem	Wiring, ABS trouble code(s) stored, incorrect ABS control module
00290	–	ABS control module, LH rear wheel speed signal – range/performance problem	Wiring, ABS trouble code(s) stored, incorrect ABS control module
00293	–	Transmission range (TR) switch	Wiring, poor connection, TR switch
00296	–	Transmission kick-down switch	Wiring, accelerator cable adjustment, transmission kick-down switch, TP sensor
00297	–	Output shaft speed (OSS) sensor – no signal	Wiring, transmission speed sensor, multi-plugs for VSS and transmission speed sensor interchanged
00299	–	Transmission mode selection switch	Wiring, transmission mode selection switch
00300	–	Transmission fluid temperature (TFT) sensor	Wiring, poor connection, TFT sensor
00347	–	Solenoid valve 8	Wiring, poor connection, transmission internal wiring, solenoid valve
00348	–	Solenoid valve 9	Wiring, poor connection, transmission internal wiring, solenoid valve
00349	–	Solenoid valve 10	Wiring, poor connection, transmission internal wiring, solenoid valve
00350	–	Earth return wire, modulation valve	Wiring open circuit, TCM
00351	–	Transmission intermediate shaft speed sensor – no signal	Wiring open circuit, transmission intermediate shaft speed sensor



VAG type	P type	Fault location	Probable cause
00518	–	Throttle position (TP) sensor	Wiring, signal from TP sensor or ECM, TP sensor
00526	–	Stop lamp switch	Wiring, stop lamp switch
00529	–	Engine RPM input – no signal	Wiring, ECM
00532	–	Transmission control module (TCM) – supply voltage	Alternator, battery, wiring
00543	–	Maximum engine RPM exceeded	Incorrect gear shift, CKP/RPM sensor, valve body, ECM
00545	–	ECM/TCM electrical connection – torque reduction signal	Wiring, ECM, TCM
00548	–	Transmission control module (TCM), fault memory – supply voltage, from battery	Fuse, supply voltage wiring, earth wiring
00549	–	ECM/TCM electrical connection – fuel consumption signal	Wiring, ECM, TCM
00596	–	Solenoid valves – short circuit	Poor connection, transmission internal wiring
00597	–	ABS control module, wheel speed signals – speed difference too great	Wiring, ABS trouble code(s) stored, incorrect ABS control module
00638	–	ECM/TCM electrical connection – TP sensor signal	Wiring, ECM, TCM
00641	–	Transmission fluid temperature (TFT) sensor – high input	ATF level incorrect, towing weight limit exceeded, transmission internal wiring, TFT sensor
00652	–	Gear monitoring – implausible signal	Wiring, hydraulic fault, clutch/valve body
00660	–	Transmission kick-down switch/throttle position (TP) sensor – implausible signal	Wiring, accelerator cable adjustment, kick-down switch, TP sensor
00668	–	Transmission control module (TCM) – supply voltage, from battery	Wiring, fuse
00753	–	ABS control module, wheel speed signals – implausible	Wiring, ABS trouble code(s) stored, incorrect ABS control module
00777	–	CAN data bus, APP sensor – incorrect signal	Wiring, APP sensor signal from ECM, ECM trouble code(s) stored
00789	–	Reverse gear position switch	Wiring, reverse gear position switch, TR switch
01044	–	Transmission control module (TCM) – coding	Incorrectly coded
01045	–	Tiptronic gear selection switch – incorrect signal	Wiring, tiptronic gear selection switch
01166	–	Engine torque signal	Trouble codes 01312/01314 stored, ECM incorrectly coded, faulty engine/component(s), ECM
01192	–	Torque converter clutch (TCC) solenoid – mechanical fault	ATF level, clutch slipping, TCC solenoid, valve body defective
01196	–	CAN data bus, ECM/TCM	Ignition switched ON with TCM disconnected, wiring, ECM, TCM
01236	–	Selector lever lock solenoid	Wiring, selector lever lock solenoid
01312	–	CAN data bus – defective	Trouble code(s) stored in other system(s), wiring
01314	–	CAN data bus, ECM	Wiring, ECM trouble code(s) stored, ECM incorrectly coded, wiring
01316	–	CAN data bus, ABS	ABS control module trouble code(s) stored, wiring



**AUDI**Model: A3 • 80 • A4 • 100/A6 • A6/Allroad • A8 • Coupé  
Cabriolet

## Transmission

VAG type	P type	Fault location	Probable cause
16955	–	Stop lamp switch – range/performance problem	Wiring, stop lamp switch
16987	–	Transmission control module (TCM) – KAM error	TCM
16989	--	Transmission control module (TCM) – ROM error	TCM
17086	–	Transmission control module (TCM) – defective	TCM
17087	–	Stop lamp switch – circuit malfunction	Wiring, stop lamp switch, ECM, TCM
17090	–	Transmission range (TR) switch – range/performance problem	Wiring, TR switch
17094	–	Transmission fluid temperature (TFT) sensor – circuit malfunction	Wiring, TFT sensor
17095	–	Transmission fluid temperature (TFT) sensor – range/performance problem	Wiring, TFT sensor
17096	–	Transmission fluid temperature (TFT) sensor – low input	Wiring, TFT sensor
17097	–	Transmission fluid temperature (TFT) sensor – high input	Wiring, TFT sensor
17100	–	Input shaft speed (ISS) sensor/turbine shaft speed (TSS) sensor – range/performance problem	Wiring, shield wiring, transmission input shaft speed sensor, engine RPM signal, TR switch, ATF level, torque converter, clutches or brakes slipping, sticking solenoid valve
17101	–	Input shaft speed (ISS) sensor/turbine shaft speed (TSS) sensor – no signal	Wiring, shield wiring, transmission input shaft speed sensor, engine RPM signal, TR switch, ATF level, transmission speed sensor, torque converter, clutches or brakes slipping, sticking solenoid valve
17105	–	Output shaft speed (OSS) sensor – range/performance problem	Wiring, shield wiring, OSS sensor, ECM/TCM input signals incorrectly transmitted, ATF level, torque converter, clutches or brakes slipping, sticking solenoid valve
17106	–	Output shaft speed (OSS) sensor – no signal	Wiring, shield wiring, ECM/TCM input signals incorrectly transmitted, OSS sensor, ATF level, torque converter, clutches or brakes slipping, sticking solenoid valve
17110	–	Engine RPM input – range/performance problem	Wiring, CKP/RPM sensor, ECM, TCM
17114	–	Incorrect gear ratio	ATF level, torque converter, clutches or brakes slipping, sticking solenoid valve, wiring, transmission speed sensor, transmission input shaft speed sensor, TCM
17115	–	Gear 1 – incorrect ratio	Clutch slipping, solenoid valve, transmission speed sensor, transmission input shaft speed sensor, TCM
17116	–	Gear 2 – incorrect ratio	Clutch slipping, solenoid valve, transmission speed sensor, transmission input shaft speed sensor, TCM
17117	–	Gear 3 – incorrect ratio	Clutch slipping, solenoid valve, transmission speed sensor, transmission input shaft speed sensor, TCM
17118	–	Gear 4 – incorrect ratio	Clutch slipping, solenoid valve, transmission speed sensor, transmission input shaft speed sensor, TCM





VAG type	P type	Fault location	Probable cause
17119	–	Gear 5 – incorrect ratio	Clutch slipping, solenoid valve, transmission speed sensor, transmission input shaft speed sensor, TCM
17125	–	Torque converter clutch (TCC) solenoid – performance or stuck off	ATF level, torque converter, wiring, TCC solenoid, torque converter pressure valve
17135	–	Shift solenoid (SS) A – performance or stuck off	Wiring open circuit/short to earth, poor connection, shift solenoid
17136	–	Shift solenoid (SS) A – stuck on	Wiring, poor connection, shift solenoid
17137	–	Shift solenoid (SS) A – electrical	Wiring, poor connection, solenoid valve
17140	–	Shift solenoid (SS) B – performance or stuck off	Wiring open circuit/short to earth, poor connection, shift solenoid
17141	–	Shift solenoid (SS) B – stuck on	Wiring, poor connection, shift solenoid
17142	–	Shift solenoid (SS) B – electrical	Wiring, poor connection, solenoid valve
17145	–	Shift solenoid (SS) C – performance or stuck off	Wiring open circuit/short to earth, poor connection, shift solenoid
17146	–	Shift solenoid (SS) C – stuck on	Wiring, poor connection, shift solenoid
17147	–	Shift solenoid (SS) C – electrical	Wiring, poor connection, solenoid valve
–	P0	Refer to EOBD trouble code table	–
17968	P1560	Maximum engine RPM exceeded	Incorrect gear shift, wiring open circuit, CKP/RPM sensor
–	P1625	CAN data bus, ECM/TCM	Ignition switched ON with TCM disconnected, wiring, ECM, TCM
18112	P1704	Transmission kick-down switch – short to earth	Wiring open circuit/short to earth, transmission kick-down switch
18141	P1733	Tiptronic gear selection switch, down shift – short to earth	Wiring short to earth, tiptronic gear selection switch
18147	P1739	Tiptronic gear selection switch, up shift – short to earth	Wiring short to earth, tiptronic gear selection switch
18152	P1744	Tiptronic gear selection switch, recognition – short to earth	Wiring short to earth, tiptronic gear selection switch
18153	P1745	Solenoid valves, supply voltage – short to positive	Wiring open circuit/short to positive, poor connection, TCM
–	P1746	Transmission control module (TCM) – supply voltage	Alternator, battery, wiring
18155	P1747	Solenoid valves, supply voltage – open circuit/short to earth	Battery, wiring open circuit/short to earth, poor connection, TCM
18156	P1748	Transmission control module (TCM) – defective	TCM
18157	P1749	Transmission control module (TCM) – coding	Incorrectly coded, ECM incorrectly coded, TCM
18158	P1750	Transmission control module (TCM) – supply voltage low	Fuse, wiring, TCM
18159	P1751	Transmission control module (TCM) – supply voltage high	Alternator, second battery incorrectly connected
18160	P1752	Transmission control module (TCM) – supply voltage	Wiring, alternator
–	P1760	Selector lever lock solenoid	Wiring, selector lever lock solenoid

**AUDI**Model: A3 • 80 • A4 • 100/A6 • A6/Allroad • A8 • Coupé  
Cabriolet**Transmission**

VAG type	P type	Fault location	Probable cause
18169	P1761	Selector lever lock solenoid – short to earth	Wiring short to earth, selector lever lock solenoid, tiptronic gear selection switch, TCM
18170	P1762	Selector lever lock solenoid – short to positive	Wiring short to positive, selector lever lock solenoid, tiptronic gear selection switch, TCM
18171	P1763	Selector lever lock solenoid – open circuit	Wiring open circuit, selector lever lock solenoid, TCM
–	P1767	ECM/TCM electrical connection – TP sensor signal	Wiring, ECM, TCM
18179	P1771	Engine control module (ECM), load signal – open circuit/short to positive	Wiring open circuit/short to positive, ECM
18180	P1772	Engine control module (ECM), load signal – short to earth	Wiring short to earth, ECM
–	P1781	ECM/TCM electrical connection, torque reduction signal – open circuit/short to earth	Wiring open circuit/short to earth, ECM, TCM
–	P1782	ECM/TCM electrical connection, torque reduction signal – short to positive	Wiring short to positive, ECM, TCM
18192	P1784	Engine control module (ECM), up/down shift signal – open circuit/short to earth	Wiring open circuit/short to earth, ECM
18193	P1785	Engine control module (ECM), up/down shift signal – short to positive	Wiring open circuit/short to positive, ECM
18108	–	Brake pressure switch – incorrect signal	Wiring, brake pressure switch
–	P1813	Solenoid valve 4	Wiring, poor connection, transmission internal wiring, solenoid valve
18222	P1814	Pressure control (PC) solenoid 1 – open circuit/short to earth	Wiring open circuit/short to earth, PC solenoid
18223	P1815	Pressure control (PC) solenoid 1 – short to positive	Wiring short to positive, PC solenoid
–	P1818	Solenoid valve 5	Wiring, poor connection, transmission internal wiring, solenoid valve
18227	P1819	Pressure control (PC) solenoid 2 – open circuit/short to earth	Wiring open circuit/short to earth, PC solenoid
18228	P1820	Pressure control (PC) solenoid 2 – short to positive	Wiring short to positive, PC solenoid
–	P1823	Solenoid valve 6	Wiring, poor connection, transmission internal wiring, solenoid valve
18232	P1824	Pressure control (PC) solenoid 3 – open circuit/short to earth	Wiring open circuit/short to earth, PC solenoid
18233	P1825	Pressure control (PC) solenoid 3 – short to positive	Wiring short to positive, PC solenoid
–	P1828	Solenoid valve 7	Wiring, poor connection, transmission internal wiring, solenoid valve
18237	P1829	Pressure control (PC) solenoid 4 – open circuit/short to earth	Wiring open circuit/short to earth, PC solenoid
18238	P1830	Pressure control (PC) solenoid 4 – short to positive	Wiring short to positive, PC solenoid
18242	P1834	Pressure control (PC) solenoid 5 – open circuit/short to earth	Wiring open circuit/short to earth, PC solenoid



VAG type	P type	Fault location	Probable cause
18243	P1835	Pressure control (PC) solenoid 5 – short to positive	Wiring short to positive, PC solenoid
18249	P1841	Engine control module (ECM)/transmission control module (TCM) – incorrectly matched	Incorrect ECM/TCM
18258	P1850	CAN data bus, ECM – missing information	Ignition switched ON with TCM disconnected, wiring, TCM
18258	P1851	CAN data bus, ABS – missing information	Ignition switched ON with TCM disconnected, wiring, TCM, ABS control module, ECM
18262	P1854	CAN data bus – defective	Wiring, ECM, TCM
18263	P1855	CAN data bus – software	Ignition switched ON with TCM disconnected, ECM, TCM
18264	P1856	Engine control module (ECM) – TP sensor signal	Wiring, ECM, TCM
18265	P1857	Engine control module (ECM) – load signal	ECM, TCM
18266	P1858	Engine control module (ECM) – RPM signal	Wiring, CKP/RPM sensor, ECM, TCM
18269	P1861	Engine control module (ECM) – APP sensor signal	Wiring, APP sensor, ECM, TCM
65535	–	Transmission control module (TCM) – defective	Mechanical/hydraulic fault, electrical/electronic component, wiring, TCM



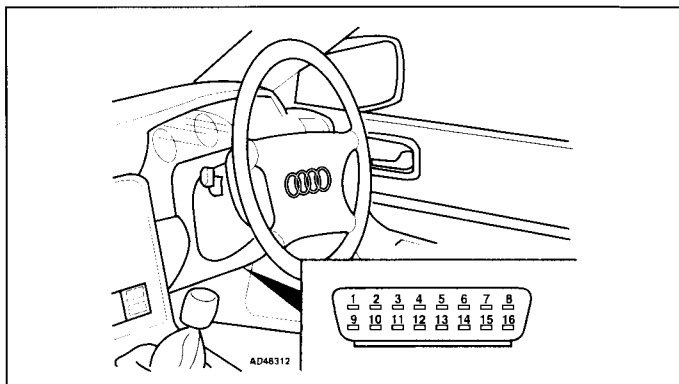
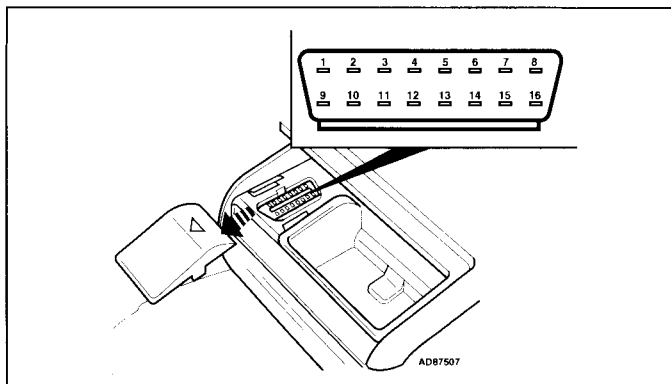
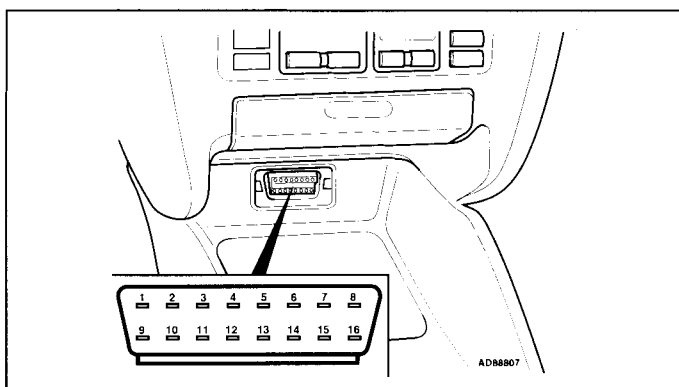
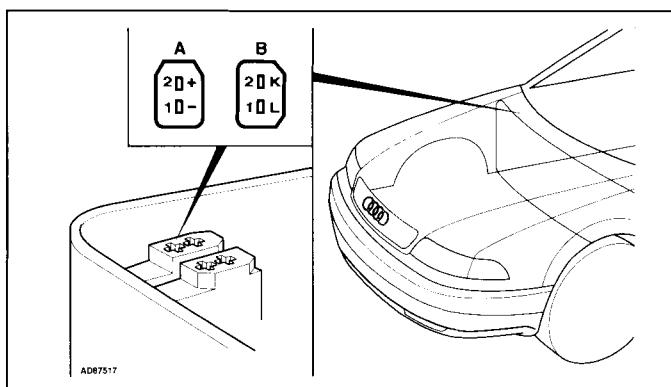
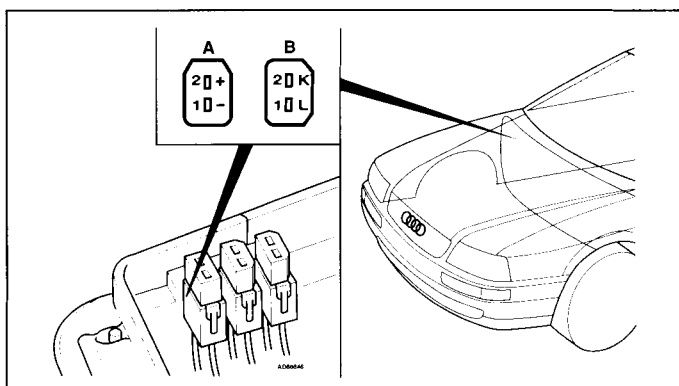
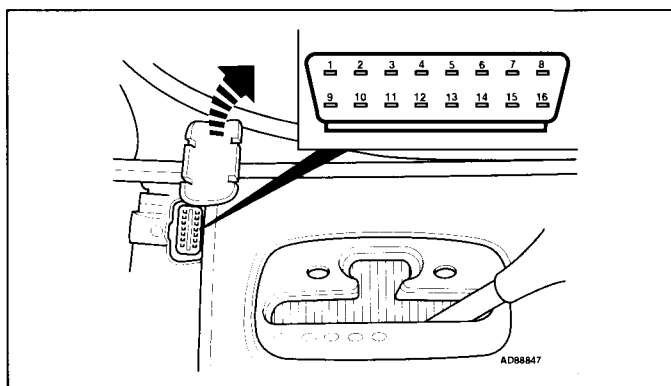
**AUDI**

Model:

A2 • A3/S3 • 80 (08/94 →) • A4/S4  
A6/S6 (07/94 →) • A6/S6/Allroad • A8/S8  
Coupé/S2 (07/94 →) • Cabriolet (07/94 →) • TT  
1994-02

Year:

Immobilizer

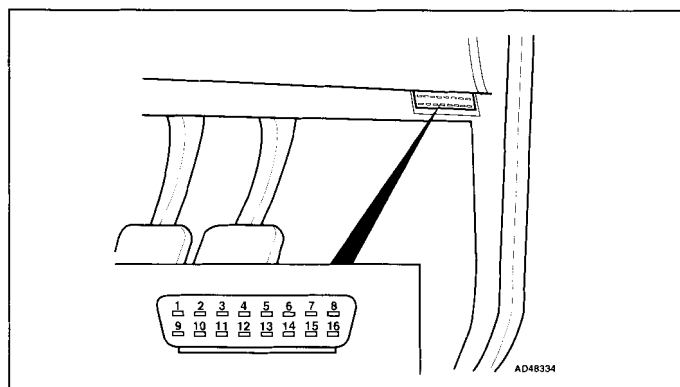
**Data link connector (DLC) locations****A2, A4/S4 2000 →, A6/S6/Allroad 1997 → – fascia, driver's side****A4/S4 1994-00 – centre console, rear****A3/S3 – centre console****A6/S6 1994-97 – in underbonnet relay plate****80, Coupé, Cabriolet, S2 – in underbonnet fusebox/relay plate****A8/S8 – under front ashtray**

Model: A2 • A3/S3 • 80 (08/94→) • A4/S4 • A6/S6 (07/94→)  
A6/S6/Allroad • A8/S8 • Coupé/S2 (07/94→)  
Cabriolet (07/94→) • TT

**AUDI**



Immobilizer



TT – fascia, driver's side

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- System malfunction: Engine runs for approximately 1 second and then cuts out.
- Data link connector (DLC) – 2-pin: (A) black, (B) brown/white.

### Accessing and erasing

- The immobilizer control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

VAG type	Fault location	Probable cause
00000	No fault found	–
00546	Immobilizer control module, data wire – implausible authorisation signal	Wiring, incorrectly coded, ignition switched OFF/ON too quickly, immobilizer control module
00750	Immobilizer warning lamp	Wiring, immobilizer warning lamp
01128	Immobilizer read coil	Wiring, immobilizer read coil, immobilizer control module
01176	Ignition key – incorrect signal	Ignition key not matched/damaged, poor connection, wiring, immobilizer read coil
01177	Engine control module (ECM)/fuel shut-off solenoid control module – not authorised	ECM/fuel shut-off solenoid control module not matched to immobilizer control module
01179	Ignition key programming – incorrectly matched	Malfunction during ignition key programming
01181	Ignition key programming – initial matching	Stored value for quantity of keys to be programmed exceeded, erase and re-check fault memory
01202	Data link connector (DLC)	Wiring short circuit, immobilizer control module
01237	Fuel shut-off solenoid	Fuel shut-off solenoid control module, fuel shut-off solenoid
01312	CAN data bus – defective	Immobilizer control module incorrectly coded, trouble code(s) stored in other system(s), wiring
01314	CAN data bus, ECM	ECM trouble code(s) stored, ECM incorrectly coded, wiring
01354	CAN data bus – authorisation signal	Wiring, immobilizer control module
65535	Immobilizer control module – defective	DLC wiring, immobilizer control module



**BMW**

Model: 316i/Compact, 318i/iS/Coupe/Compact, 320i, 325i (E36) • Z3 1,8i • 518i, 520i, 525i/iX (E34) 750i (E32) • 850i/CSI (E31)

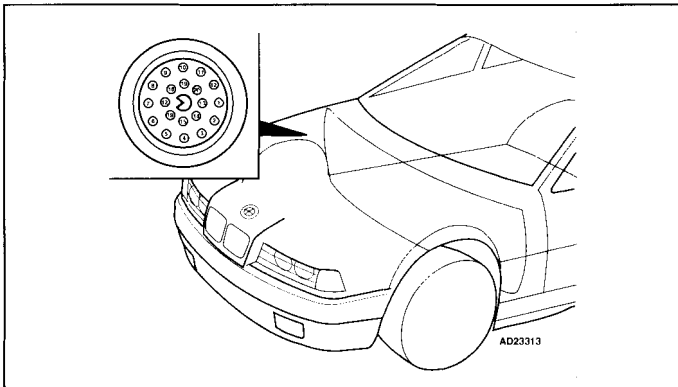
Year: 1987-00

Engine code: 16 4E 1, 16 4 E2, 18 4E 1, 18 4S 1, 18 4E 2, 20 6S 2, 25 6S 2, 50 12 A, 56 12 1

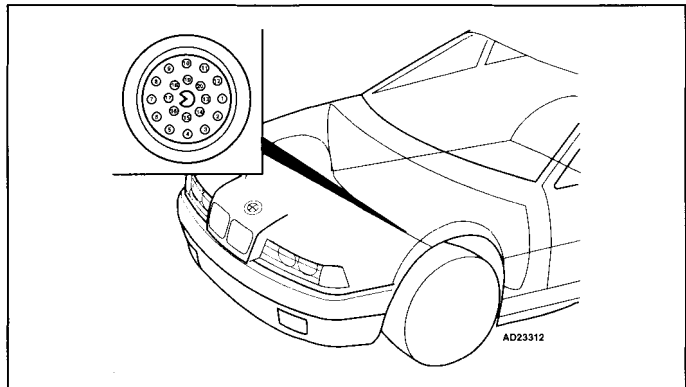
System: Motronic M1.2/1.3/1.7/1.7.2/1.7.3/3.1

## Engine management

### Data link connector (DLC) locations



Z3, 3 Series (M1.2/1.7/3.1), 5 Series, 8 Series – engine bay RH side



3 Series (M1.7.2/1.7.3), 7 Series – engine bay LH side

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to one of the ECM terminals.
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

#### Accessing – flash type

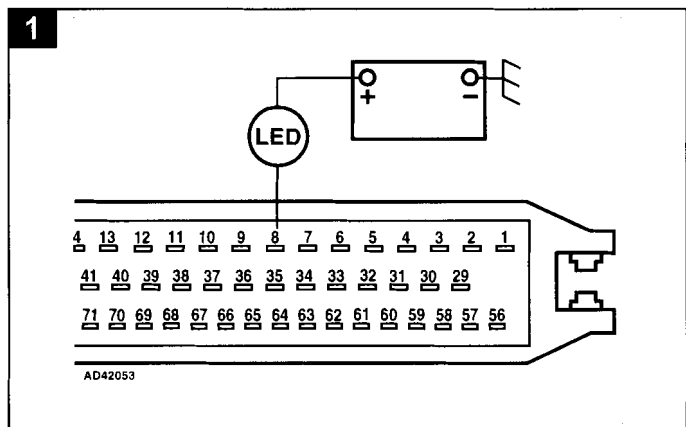
**NOTE:** *Flash type cannot be accessed from some engine control modules (ECM).*

- Ensure ignition switched OFF.
- Connect breakout box between ECM and harness multi-plug.
- ECM located in plenum chamber.
- Motronic M1.7/3.1: Connect LED tester between breakout box terminal 8 and battery (12 volt) positive **1**.
- Motronic M1.2: Connect LED tester between breakout box terminal 15 and battery (12 volt) positive **2**.
- Switch ignition ON.
- Depress accelerator pedal fully 5 times within 5 seconds.
- V12: To access trouble codes from ECM LH bank, depress accelerator pedal fully 6 times within 5 seconds.

**NOTE:** *V12 engine is controlled by two ECMs, RH bank and LH bank.*

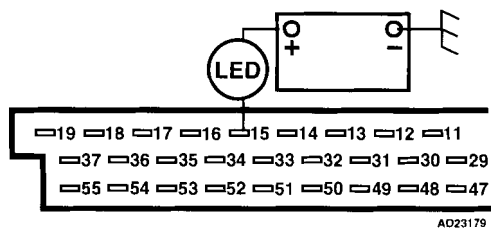
- Count LED flashes. Note trouble codes. Compare with trouble code table.
- Long flash indicates start of trouble code display **3** [A].
- Each trouble code consists of four groups of flashes **3** [B].

- For example: Trouble code 1211 displayed: Engine control module (ECM) **3** [B].
- LED flashes code 0000 **4**, 1000 **5** or 2000 **6** at end of trouble code output.
- Switch ignition OFF.
- Disconnect LED.

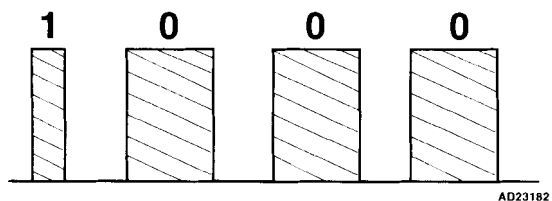




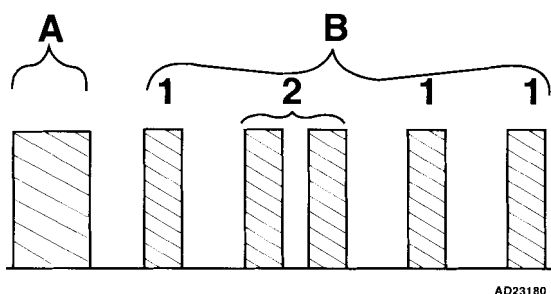
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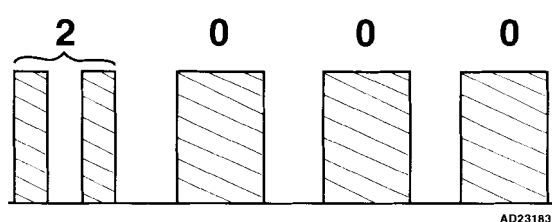
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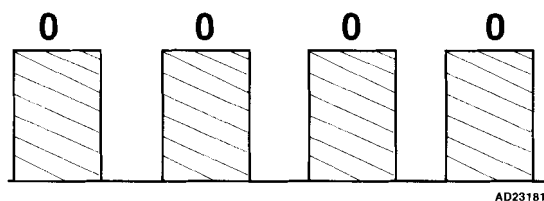
3



6



4



### Erasing – flash type

- Depress accelerator pedal fully for 10 seconds minimum when trouble code 0000, 1000 or 2000 (end of output) is flashed.
- Switch ignition OFF.

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518i, 520i, 525i/iX (E34) • 750i (E32) • 850i/CSI (E31)**Engine management****Trouble code identification**

NOTE: V12: Flash types 1xxx for RH bank, 2xxx LH bank.

Flash type	Fault location	Probable cause
0000	End of trouble code output	–
1000	End of trouble code output	–
1211	Engine control module (ECM) – defective	Disconnect ECM multi-plug for at least 10 min. – check if trouble code reappears before replacing ECM
1215	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – incorrect signal	Wiring, connector(s), MAF sensor/VAF sensor
1216	Throttle position (TP) sensor – defective	Wiring, connector(s), TP sensor
1218	Engine control module (ECM) – output stage	Wiring, ECM controlled components
1221	Heated oxygen sensor (HO2S) – circuit malfunction	Wiring, connector(s), HO2S
1222	Heated oxygen sensor (HO2S) – range/performance problem	Wiring, intake/exhaust leak, fuel level low, fuel pressure, EVAP canister purge valve, injector(s), HO2S, ECM
1223	Engine coolant temperature (ECT) sensor – malfunction	Wiring, connector(s), ECT sensor
1224	Intake air temperature (IAT) sensor – malfunction	Wiring, connector(s), IAT sensor
1225	Knock sensor (KS) 1 – defective	Wiring, connector, KS incorrectly tightened
1226	Knock sensor (KS) 2 – defective	Wiring, connector, KS incorrectly tightened
1231	Battery voltage – too low/high	Wiring, alternator, battery
1232	Closed throttle position (CTP) switch – malfunction	Wiring, connector, CTP switch, ECM
1233	Throttle position (TP) sensor – malfunction	Wiring, TP sensor, ECM
1234	Vehicle speed sensor (VSS) – incorrect/no signal	Wiring, instrument panel, VSS
1235	Torque converter clutch (TCC) solenoid – defective	Wiring, TCC solenoid
1236	Throttle control, traction control system (TCS) – defective	Wiring, connector(s), throttle control system
1236 ■	Engine control module (ECM)/ABS control module communication, ASR system	Wiring, ABS trouble code(s) stored, ECM
1237	AC compressor clutch relay – malfunction	Wiring, AC compressor clutch relay
1238	Intake manifold air control solenoid – circuit malfunction	Wiring, connector, intake manifold air control solenoid
1238 ■	Engine control module (ECM) – unused output stage	Wiring short to earth/positive, ignore flash code if terminal 18 not connected
1241	Engine control module (ECM) – no supply voltage	Wiring, fuse(s), battery
1241 ■	Engine control module (ECM)/ABS control module communication, traction control system (TCS)	Wiring, ABS trouble code(s) stored, ECM
1241 ■	Engine control module (ECM), electronic throttle system (ETS) – overrun torque control	Wiring short to positive, ECM
1242	AC control module/engine control module (ECM) communication – malfunction	Wiring, AC control module
1243	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – incorrect/no signal	Wiring, CKP sensor/RPM sensor
1244	Camshaft position (CMP) sensor – range/performance problem	Wiring, CMP sensor
1245	Engine control module (ECM)/transmission control module (TCM) communication – short to earth	Wiring, ECM, TCM
1247	Ignition circuit – primary circuit	Wiring, ignition coil(s)





Flash type	Fault location	Probable cause
1251	Injector(s), group 1 – circuit malfunction	Wiring, injector(s)
1251	Injector, cyl. 1 – circuit malfunction	Wiring, injector
1252	Injector(s), group 2 – circuit malfunction	Wiring, injector(s)
1252	Injector, cyl. 5 – circuit malfunction	Wiring, injector
1253	Injector, cyl. 3 – circuit malfunction	Wiring, injector
1254	Injector, cyl. 6 – circuit malfunction	Wiring, injector
1255	Injector, cyl. 2 – circuit malfunction	Wiring, injector
1256	Injector, cyl. 4 – circuit malfunction	Wiring, injector
1261	Fuel pump relay – malfunction	Wiring, connector(s), fuel pump relay
1262	Idle speed control (ISC) actuator/idle air control (IAC) valve – malfunction	Wiring, connector(s), ISC actuator/IAC valve
1263	Evaporative emission (EVAP) canister purge valve – malfunction	Wiring, connector(s), EVAP canister purge valve
1264	Oxygen sensor heater relay – malfunction	Wiring, connector, oxygen sensor heater relay
1265	Malfunction indicator lamp (MIL) – short to earth/positive	Wiring short to earth/positive, MIL
1268	Mixture adjustment resistor – signal too low/high	Wiring, mass air flow (MAF) sensor
1271	Ignition circuit – defective	Wiring, connector, ignition coil, ECM
1271	Ignition circuit, cyl. 1 – defective	Wiring, connector, ignition coil, ECM
1272	Ignition circuit, cyl. 5 – defective	Wiring, connector, ignition coil, ECM
1273	Ignition circuit, cyl. 3 – defective	Wiring, connector, ignition coil, ECM
1274	Ignition circuit, cyl. 6 – defective	Wiring, connector, ignition coil, ECM
1275	Ignition circuit, cyl. 2 – defective	Wiring, connector, ignition coil, ECM
1276	Ignition circuit, cyl. 4 – defective	Wiring, connector, ignition coil, ECM
1278	Transmission control module (TCM) – signal	Wiring, TCM
1281	Battery voltage – too low	Wiring, alternator, battery
1282	Engine control module (ECM) – internal fault	Disconnect ECM multi-plug for at least 10 min. – check if trouble code reappears before replacing ECM
1283	Injector(s) – circuit malfunction	Wiring, injector(s)
1285	Engine control module (ECM)/alarm system control module communication – alarm system active	Wiring short to positive, alarm system control module
1286	Knock control circuit – defective	Wiring, connector, KS incorrectly tightened, knock sensor (KS), ECM
1287	Engine control module (ECM) – electronic throttle system (ETS) signal	Wiring short to positive, ignore flash code if terminal 62 not connected
1288	Engine control module (ECM) – internal fault	ECM
1288	Engine control module (ECM) – automatic stability control (ASR)/overrun torque control defective	Wiring, ETS, ABS trouble code(s) stored
1444	No fault found	–
1513	Engine control module (ECM) – unused output stage	Wiring short to earth/positive, ignore flash code if terminal 18 not connected
2000	End of trouble code output	–
2211	Engine control module (ECM) – defective	Disconnect ECM multi-plug for at least 10 min. – check if trouble code reappears before replacing ECM



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518i, 520i, 525i/iX (E34) • 750i (E32) • 850i/CSI (E31)**Engine management**

Flash type	Fault location	Probable cause
2215	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – incorrect signal	Wiring, connector(s), MAF sensor/VAF sensor
2218	Engine control module (ECM) – output stage	Wiring, ECM controlled components
2221	Heated oxygen sensor (HO2S) – circuit malfunction	Wiring, connector(s), HO2S
2222	Heated oxygen sensor (HO2S) – range/performance problem	Wiring, intake/exhaust leak, fuel level low, fuel pressure, evaporative emission (EVAP) canister purge valve, injector(s), HO2S, ECM
2223	Engine coolant temperature (ECT) sensor – malfunction	Wiring, connector(s), ECT sensor
2224	Intake air temperature (IAT) sensor – malfunction	Wiring, connector(s), IAT sensor
2231	Battery voltage – too low/high	Wiring, alternator, battery
2232	Closed throttle position (CTP) switch – malfunction	Wiring, connector, CTP switch, ECM
2233	Throttle position (TP) sensor – malfunction	Wiring, TP sensor, ECM
2234	Vehicle speed sensor (VSS) – incorrect/no signal	Wiring, instrument panel, VSS
2235	Torque converter clutch (TCC) solenoid – defective	Wiring, TCC solenoid
2236	Engine control module (ECM)/ABS control module communication, automatic stability control (ASR) system	Wiring, ABS trouble code(s) stored, ECM
2237	AC compressor clutch relay – malfunction	Wiring, AC compressor clutch relay
2241	Engine control module (ECM)/ABS control module communication, traction control system (TCS)	Wiring, ABS trouble code(s) stored, ECM
2244	Camshaft position (CMP) sensor – range/performance problem	Wiring, CMP sensor
2245	Engine control module (ECM)/transmission control module (TCM) communication – short to earth	Wiring, ECM, TCM
2444	No fault found	–
2251	Injector(s), group 1 – circuit malfunction	Wiring, injector(s)
2252	Injector(s), group 2 – circuit malfunction	Wiring, injector(s)
2261	Fuel pump relay – malfunction	Wiring, connector(s), fuel pump relay
2263	Evaporative emission (EVAP) canister purge valve – malfunction	Wiring, connector(s), EVAP canister purge valve
2264	Oxygen sensor heater relay – malfunction	Wiring, connector, oxygen sensor heater relay
2265	Malfunction indicator lamp (MIL) – short to earth/positive	Wiring short to earth/positive, MIL
2268	Mixture adjustment resistor – signal too low/high	Wiring, mass air flow (MAF) sensor
2278	Transmission control module (TCM) – signal	Wiring, TCM
2513	Engine control module (ECM) – unused output stage	Wiring short to earth/positive – ignore flash code if terminal 18 not connected
4444	No fault found	–

**1** Motronic M1.7 (V12), M3.1**2** Motronic M3.1**3** Motronic M1.7 (V12)



## Accessing and erasing – scanner type

- The engine control module (ECM) fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

## Trouble code identification

Scanner type	Fault location	Probable cause
–	No fault found	–
0	Engine control module (ECM) – undefined fault	–
1	Engine control module (ECM) – defective	ECM
1 <b>1</b>	Fuel pump relay – malfunction	Wiring, connector(s), fuel pump relay
2	Idle speed control (ISC) actuator/idle air control (IAC) valve – malfunction	Wiring, connector(s), ISC actuator/IAC valve
3 <b>■</b>	Fuel pump relay – malfunction	Wiring, connector(s), fuel pump relay
3	Injector(s), cyl. 1 & 3 or cyl. 2, 4, 6 & 8, 10, 12 – circuit malfunction	Wiring, injector(s)
3 <b>3</b>	Injector(s), cyl. 2 & 4 – circuit malfunction	Wiring, injector(s)
3 <b>4</b>	Injector(s), cyl. 1 – circuit malfunction	Wiring, injector
4	Injector(s), cyl. 3 – circuit malfunction	Wiring, injector
5	Evaporative emission (EVAP) canister purge valve – malfunction	Wiring, connector(s), EVAP canister purge valve
5 <b>4</b>	Injector(s), cyl. 2 – circuit malfunction	Wiring, injector
6	Injector(s) – circuit malfunction	Wiring, injector(s)
7	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – incorrect signal	Wiring, connector(s), MAF sensor/VAF sensor
10	Heated oxygen sensor (HO2S) – range/performance problem	Wiring, intake/exhaust leak, fuel level low, fuel pressure, evaporative emission (EVAP) canister purge valve, injector(s), ECM
12	Throttle position (TP) sensor – defective	Wiring, connector(s), TP sensor
15	Knock sensor (KS) 1 – defective	Wiring, connector, KS incorrectly tightened, KS
16	Injector(s), cyl. 1, 3, 5 & 7, 9, 11 – circuit malfunction	Wiring, injector(s)
16 <b>1</b>	Camshaft position (CMP) sensor – range/performance problem	Wiring, CMP sensor
17	Injector(s), cyl. 2, 4, 6 & 8, 10, 12 – circuit malfunction	Wiring, injector(s)
18	Engine control module (ECM) – unused output stage	Wiring short to earth/positive, ignore flash code if terminal 18 not connected
18 <b>5</b>	Intake manifold air control solenoid – circuit malfunction	Wiring, connector, intake manifold air control solenoid
19	Engine control module (ECM) – unused output stage	Wiring short to earth/positive, ignore flash code if terminal 18 not connected
23	Oxygen sensor heater relay – malfunction	Wiring, connector, oxygen sensor heater relay
23 <b>4</b>	Ignition circuit, cyl. 2 – defective	Wiring, connector, ignition coil, ECM
24	Engine control module (ECM)/transmission control module (TCM) communication	Wiring short to earth, TCM trouble code(s) stored
24 <b>■</b>	Ignition circuit, cyl. 3 – defective	Wiring, connector, ignition coil, ECM
25	Ignition circuit, cyl. 1 – defective	Wiring, connector, ignition coil, ECM



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518i, 520i, 525i/iX (E34) • 750i (E32) • 850i/CSI (E31)**Engine management**

Scanner type	Fault location	Probable cause
26	Battery voltage – too low	Wiring, alternator, battery
28	Heated oxygen sensor (HO2S) – circuit malfunction	Wiring, connector(s), HO2S
29	Idle speed control (ISC) actuator/idle air control (IAC) valve – malfunction	Wiring, connector(s), ISC actuator/IAC valve
31	Injector, cyl. 5 – circuit malfunction	Wiring, injector
32	Injector(s), cyl. 2 & 4 – circuit malfunction	Wiring, injector(s)
32 ■	Injector(s), cyl. 1, 3, 5 & 7, 9, 11 – circuit malfunction	Wiring, injector(s)
32 ■	Injector(s), cyl. 1 & 3 – circuit malfunction	Wiring, injector(s)
32 ■	Injector, cyl. 6 – circuit malfunction	Wiring, injector
33	Injector, cyl. 4 – circuit malfunction	Wiring, injector
36	Evaporative emission (EVAP) canister purge valve – malfunction	Wiring, connector(s), EVAP canister purge valve
37	Battery voltage – too low/high	Wiring, alternator, battery
37 1	Oxygen sensor heater relay – malfunction	Wiring, connector, oxygen sensor heater relay
38	Engine control module (ECM)/ABS control module communication, acceleration skid control (ASR) system	Wiring, ABS trouble code(s) stored, ECM
41	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – incorrect signal	Wiring, connector(s), MAF sensor/VAF sensor
42	Knock sensor (KS) 2 – defective	Wiring, connector, KS incorrectly tightened, KS
44	Intake air temperature (IAT) sensor – malfunction	Wiring, connector(s), IAT sensor
45	Engine coolant temperature (ECT) sensor – malfunction	Wiring, connector(s), ECT sensor
46	AC condenser blower motor relay – short to positive	Wiring short to positive, AC condenser blower motor relay, ECM
46 ■	Engine control module (ECM) – output stage	Wiring, ECM controlled components
48	AC compressor clutch relay – malfunction	Wiring, AC compressor clutch relay
50	Ignition circuit, cyl. 4 – defective	Wiring, connector, ignition coil, ECM
51	Transmission control module (TCM) – signal	Wiring, TCM
51 4	Ignition circuit, cyl. 6 – defective	Wiring, connector, ignition coil, ECM
52	Closed throttle position (CTP) switch – malfunction	Wiring, connector, CTP switch, ECM
52 ■	Ignition circuit, cyl. 5 – defective	Wiring, connector, ignition coil, ECM
53	Throttle position (TP) sensor/wide open throttle (WOT) switch – malfunction	Wiring, TP sensor, ECM
54	Engine control module (ECM)/transmission control module (TCM) communication	Wiring short to earth, TCM trouble code(s) stored
54 1	Battery voltage – too low/high	Wiring, alternator, battery
55	Ignition circuit – defective	Wiring, connector, ignition coil, ECM
62	Engine control module (ECM) – electronic throttle system (ETS) signal	Wiring short to positive, ignore flash code if terminal 62 not connected
63	Torque converter clutch (TCC) solenoid – defective	Wiring, TCC solenoid
64	Engine control module (ECM)/transmission control module (TCM) communication – short to earth	Wiring, TCM trouble code(s) stored, ECM, TCM



Scanner type	Fault location	Probable cause
67	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – incorrect/no signal	Wiring, CKP sensor/RPM sensor
70	Heated oxygen sensor (HO2S) – circuit malfunction	Wiring, connector(s), HO2S
73	Vehicle speed sensor (VSS) – incorrect/no signal	Wiring, instrument panel, VSS
76	Mixture adjustment resistor – signal too low/high	Wiring, mass air flow (MAF) sensor
77	Intake air temperature (IAT) sensor – malfunction	Wiring, connector(s), IAT sensor
78	Engine coolant temperature (ECT) sensor – malfunction	Wiring, connector(s), ECT sensor
81	Engine control module (ECM)/immobilizer control module communication – malfunction	Wiring, electrical interference, immobilizer control module, ECM
81 <sup>4</sup>	Engine control module (ECM)/alarm system control module communication – alarm system active	Wiring short to positive, alarm system control module
82	Engine control module (ECM)/ABS control module communication, traction control system (TCS)	Wiring, ABS trouble code(s) stored, ECM
82 <sup>4</sup>	Engine control module (ECM), electronic throttle system (ETS) – overrun torque control	Wiring short to positive, ECM
83	Throttle control, traction control system (TCS) – defective	Wiring, connector(s), throttle control system
83 <sup>4</sup>	Engine control module (ECM) – acceleration skid control (ASR) defective	Wiring short to positive, ECM
85	Air conditioning (AC) control module/engine control module (ECM) communication – malfunction	Wiring, AC control module
100	Engine control module (ECM) – output stage	Wiring, ECM controlled components
200	Engine control module (ECM) – defective	Disconnect ECM multi-plug for at least 10 min. – check if trouble code reappears before replacing ECM
201	Heated oxygen sensor (HO2S) – range/performance problem	Wiring, intake/exhaust leak, fuel level low, fuel pressure, evaporative emission (EVAP) canister purge valve, injector(s), HO2S, ECM
202	Engine control module (ECM) – internal fault	Disconnect ECM multi-plug for at least 10 min. – check if trouble code reappears before replacing ECM
203	Ignition circuit – primary circuit	Wiring, ignition coil(s)
204	Engine control module (ECM) – acceleration skid control (ASR)/overrun torque control defective	Wiring, trouble code(s) stored in other system(s)
206	Knock control circuit – defective	Wiring, connector, knock sensor (KS), ECM
207	Knock control circuit – range/performance problem	Wiring, connector, KS incorrectly tightened, knock sensor (KS)
220	Engine control module (ECM) – immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective
300	Engine control module (ECM) – engine cannot be started	Wiring, engine speed (RPM) sensor, mass air flow (MAF) sensor/volume air flow (VAF) sensor, fuel pump relay, ignition system, injector(s), fuel pressure, throttle control system

<sup>1</sup> Motronic M1.7/1.7.2/1.7.3/3.1

<sup>2</sup> Motronic M1.2

<sup>3</sup> Motronic M1.7.3

<sup>4</sup> Motronic M3.1

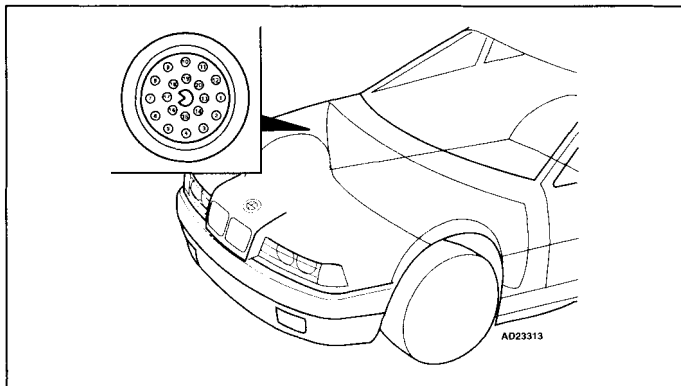
<sup>5</sup> Motronic M1.7.2/1.7.3

<sup>6</sup> Motronic M1.7, V12



**BMW**

Model: 325td/tds (E36) • 525td/tds (E34)  
 Year: 1991-99  
 Engine code: 25 6T 1/-L  
 System: Bosch EDC 1.2.3 (DDE 2)

**Engine management****Data link connector (DLC) locations**

Underbonnet, RH

**Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

**Accessing and erasing**

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification**

Scanner type	Fault location	Probable cause
1	Fuel quantity adjuster, in fuel injection pump – mechanical/electrical fault	Wiring, connector, fuel quantity adjuster
3	Fuel shut-off solenoid, in fuel injection pump – electrical fault	Wiring, connector, fuel shut-off solenoid, ECM
3	Engine coolant temperature (ECT) sensor – malfunction	Wiring, connector, ECT sensor
5	Injector needle lift sensor – malfunction	Wiring, connector, air in fuel system, fuel leak, fuel level low, RPM sensor, injector needle lift sensor, shield wiring, ECM
6	Glow plug(s) – circuit malfunction	Wiring, connector, glow plug(s), glow plug timer relay, ECM
9	Vehicle speed sensor (VSS) – signal	Wiring, connector, VSS, instrument panel
10	Fuel injection timing solenoid, in fuel injection pump – malfunction	Fuel filter, fuel pump, air in fuel system, fuel injection timing solenoid
10	Cruise control module – malfunction	Wiring, connectors, cruise control module



Scanner type	Fault location	Probable cause
11	Engine control module (ECM) – internal fault	ECM
12	Intake air temperature (IAT) sensor – malfunction	Wiring, connector, IAT sensor
15	Engine control module (ECM) – supply voltage	Wiring, connectors, battery
15	Exhaust gas recirculation (EGR) solenoid – defective	Wiring, EGR solenoid
20	Cruise control module – malfunction	Wiring, connectors, cruise control module
21	Fuel quantity adjuster position sensor, in fuel injection pump – malfunction	Wiring, connector, fuel quantity adjuster position sensor
23	Battery voltage – too low	Wiring, alternator, battery
25	Glow plug timer relay – defective	Wiring, glow plug timer relay, ECM
27	Alarm system control module – circuit malfunction	Wiring, alarm system control module
28	Clutch pedal position (CPP) switch – malfunction	Wiring, connector, CPP switch
29	Vehicle speed sensor (VSS) – signal	Wiring, connector, VSS, instrument panel
31	Brake pedal position (BPP) switch – malfunction	Wiring, connector, BPP switch
35	Fuel temperature sensor, in fuel injection pump – circuit malfunction	Wiring, connector, fuel injection pump
36	Fuel filter warning lamp switch – water detected	Drain fuel filter
37	Accelerator pedal position (APP) sensor – malfunction	Wiring, connector, APP sensor
45	Alarm system control module – circuit malfunction	Wiring, alarm system control module
47	Engine speed (RPM) sensor – circuit malfunction	Wiring, connectors, flywheel ring gear damaged, air gap, RPM sensor
52	Intake air temperature (IAT) sensor – malfunction	Wiring, connector, IAT sensor
53	Engine coolant temperature (ECT) sensor – malfunction	Wiring, connector, ECT sensor
54	Manifold absolute pressure (MAP) sensor, TC system – malfunction	Wiring, connector, intake leak, MAP sensor
56	Engine control module (ECM) – internal fault	ECM
58	Engine control module (ECM) – output stages	Wiring, ECM controlled components, ECM
59	Turbocharger (TC) boost pressure – low/high	Wiring, MAP sensor, hose(s), TC bypass valve, TC
129	Engine speed (RPM) sensor – circuit malfunction	Wiring, connectors, flywheel ring gear damaged, air gap, RPM sensor
130	Fuel temperature sensor, in fuel injection pump – circuit malfunction	Wiring, connector, fuel injection pump
132	Accelerator pedal position (APP) sensor – malfunction	Wiring, connector, APP sensor
133	Manifold absolute pressure (MAP) sensor, TC system – malfunction	Wiring, connector, intake leak, MAP sensor
134	Fuel quantity adjuster position sensor, in fuel injection pump/injector needle lift sensor – malfunction	Wiring, connector, fuel quantity adjuster position sensor, injector needle lift sensor, shield wiring
135	Turbocharger (TC) system – malfunction	Wiring, connectors, hoses, TC, TC bypass valve, MAP sensor, ECM

**BMW**

Model: 325td/tds (E36) • 525td/tds (E34)

**Engine management**

<b>Scanner type</b>	<b>Fault location</b>	<b>Probable cause</b>
136	Fuel quantity adjuster, in fuel injection pump – malfunction	Wiring, fuel quantity adjuster
142	Injector needle lift sensor – malfunction	Wiring, connector, air in fuel system, fuel leak, fuel level low, RPM sensor, injector needle lift sensor, shield wiring, ECM
144	Start of injection – malfunction	Wiring, fuel injection timing solenoid, fuel pressure, fuel filter
146	Brake pedal position (BPP) switch – malfunction	Wiring, connector, BPP switch
147	Barometric pressure (BARO) sensor, incorporated in ECM – malfunction	ECM
148	Fuel shut-off solenoid, in fuel injection pump – defective	Wiring, connector, fuel shut-off solenoid
149	Engine control module (ECM) – output stages	Wiring, ECM controlled components
150	Fuel filter warning lamp switch – water detected	Wiring, drain fuel filter
154	Clutch pedal position (CPP) switch – malfunction	Wiring, connector, CPP switch
300	Engine operation not possible	Wiring, connectors, mechanical fault, fuel system, pre-heating system, starting system
301	Irregular engine speed	Injector(s), fuel injection pump, fuel shut-off solenoid, air in fuel system, vehicle speed signal, accelerator pedal jammed
302	Engine performance, loss of power	Injector(s), air filter blocked, turbocharger (TC) boost pressure
303	Engine cuts out	Wiring, engine control relay, fuel shut-off solenoid, vehicle speed sensor (VSS), fuel quantity adjuster position sensor

1 →1992





Model: 3 Series/Compact (E36) • 3 Series (E46)  
520i (E34) • 5 Series (E39) • 7 Series (E38) • Z3

Year: 1992-00

Engine code: 19 4E/S 1, 20 6S 2/3/4, 25 6S 3/4, 28 6S 2, 35 8S 1/2,  
35 8S 2, 44 8S 1/2, 54 12 1/2

System: Siemens MS40/41/42

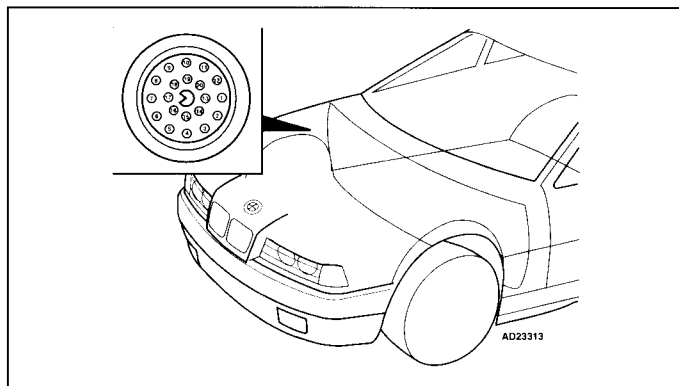
Trouble codes: Scanner type

**BMW**

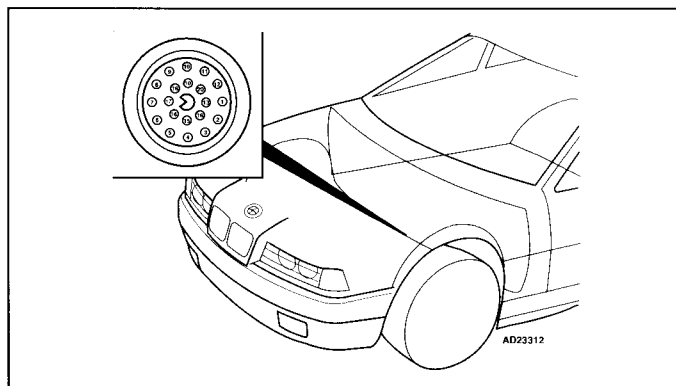


## Engine management

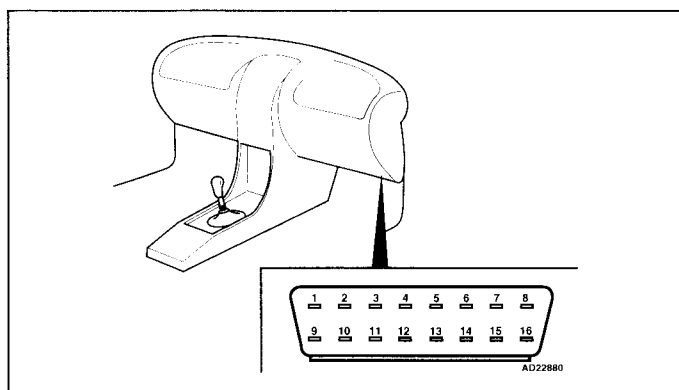
### Data link connector (DLC) locations



Z3, 3 Series, 5 Series, 7 Series – engine bay RH side



3 Series Compact – engine bay LH side



3 Series (E46), Z3, 5 Series (E39) – 2000 →

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

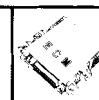
#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**NOTE:** Some models may have both DLCs fitted. DO NOT open 20-pin DLC while using 16-pin DLC.

**BMW**Model: 3 Series/Compact (E36) • 3 Series (E46) • 520i (E34)  
5 Series (E39) • 7 Series (E38) • Z3**Engine management****Trouble code identification**

Scanner type	Fault location	Probable cause
–	Engine control module (ECM) – data exchange not possible	Wiring between DLC and ECM, supply voltage, engine control relay, DLC
0	Engine control module (ECM) – undefined fault	Disconnect ECM multi-plug for at least 10 min. – check if trouble code reappears before replacing ECM
00	No fault found	–
1	Ignition circuit, cyl. 1 – defective	Wiring, connector, ignition coil, ECM
	MS42: Ignition circuit, cyl. 2 – defective	Wiring, connector, ignition coil, ECM
2	MS41: Ignition circuit, cyl. 2 – defective	Wiring, connector, ignition coil, ECM
	Ignition circuit, cyl. 3 – defective	Wiring, connector, ignition coil, ECM
	MS42: Ignition circuit, cyl. 4 – defective	Wiring, connector, ignition coil, ECM
3	MS41: Ignition circuit, cyl. 4 – defective	Wiring, connector, ignition coil, ECM
	Ignition circuit, cyl. 5 – defective	Wiring, connector, ignition coil, ECM
	MS42: Ignition circuit, cyl. 6 – defective	Wiring, connector, ignition coil, ECM
5	MS41: Ignition circuit, cyl. 6 – defective	Wiring, connector, ignition coil, ECM
	Injector, cyl. 6 – circuit malfunction	Wiring, injector
	MS42: Injector, cyl. 2 – circuit malfunction	Wiring, injector
6	MS41: Injector, cyl. 2 – circuit malfunction	Wiring, injector
	Injector, cyl. 4 – circuit malfunction	Wiring, injector
	MS42: Injector, cyl. 1 – circuit malfunction	Wiring, injector
8	MS41: Injector, cyl. 1 – circuit malfunction	Wiring, injector
	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – circuit malfunction	Wiring, connector(s), MAF sensor/VAF sensor
10	AC control module/ECM communication – malfunction	Wiring, AC control module
	MS42: Engine coolant temperature (ECT) sensor – malfunction	Wiring, connector(s), ECT sensor
11	MS41/42: Engine coolant temperature (ECT) sensor – malfunction	Wiring, connector(s), ECT sensor
	Evaporative emission (EVAP) pressure sensor – malfunction	Wiring, EVAP pressure sensor
12	Vehicle speed sensor (VSS) – incorrect/no signal	Wiring, instrument panel, VSS
	MS42: Engine coolant temperature (ECT) sensor – malfunction	Wiring, connector(s), ECT sensor
14	MS41: Throttle position (TP) sensor – defective	Wiring, connector(s), TP sensor
	ECM/transmission control module (TCM) communication – short to earth	Wiring, ECM, TCM
	MS42: Intake air temperature (IAT) sensor – malfunction	Wiring, connector(s), IAT sensor
16	MS41: Intake air temperature (IAT) sensor – malfunction	Wiring, connector(s), IAT sensor
	AC control module – signal	Wiring, AC condenser blower motor relay, AC refrigerant high pressure switch, AC refrigerant low pressure switch, AC control module



Scanner type	Fault location	Probable cause
18	ECM/immobilizer control module communication – signal	Wiring, immobilizer control module
	MS42: Camshaft position (CMP) sensor 2 – circuit malfunction	Wiring, connector, CMP sensor
19	MS42: Camshaft position (CMP) actuator 2 – circuit malfunction	Wiring, connector, CMP actuator
20	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, bulb, ECM
21	Camshaft position (CMP) actuator – malfunction	Wiring, connector, CMP actuator
	MS42: Camshaft position (CMP) actuator 1 – circuit malfunction	Wiring, connector, CMP actuator
22	Injector, cyl. 3 – circuit malfunction	Wiring, injector
23	Injector, cyl. 1 – circuit malfunction	Wiring, injector
	MS42: Injector, cyl. 6 – circuit malfunction	Wiring, injector
24	MS41: Injector, cyl. 6 – circuit malfunction	Wiring, injector
	AC compressor clutch relay – malfunction	Wiring, AC compressor clutch relay
	MS42: Injector, cyl. 4 – circuit malfunction	Wiring, injector
25	MS41: Injector, cyl. 4 – circuit malfunction	Wiring, injector
	MS40/42: Oxygen sensor heater 1, bank 1 – circuit malfunction	Wiring, connector, engine control relay, HO2S, ECM
27	Idle speed control (ISC) actuator/idle air control (IAC) valve – malfunction	Wiring, connector(s), ISC actuator/IAC valve, ECM
29	Ignition circuit, cyl. 2 – defective	Wiring, connector, ignition coil, ECM
	MS42: Ignition circuit, cyl. 1 – defective	Wiring, connector, ignition coil, ECM
30	MS41: Ignition circuit, cyl. 1 – defective	Wiring, connector, ignition coil, ECM
	Ignition circuit, cyl. 4 – defective	Wiring, connector, ignition coil, ECM
	MS42: Ignition circuit, cyl. 3 – defective	Wiring, connector, ignition coil, ECM
31	MS41: Ignition circuit, cyl. 3 – defective	Wiring, connector, ignition coil, ECM
	Ignition circuit, cyl. 6 – defective	Wiring, connector, ignition coil, ECM
	MS42: Ignition circuit, cyl. 5 – defective	Wiring, connector, ignition coil, ECM
33	MS41: Ignition circuit, cyl. 5 – defective	Wiring, connector, ignition coil, ECM
	MS40/42: Injector, cyl. 5 – circuit malfunction	Wiring, injector
35	Secondary air injection (AIR) pump relay – malfunction	Wiring, connector, AIR pump relay
38	Clutch pedal position (CPP) switch – malfunction	Wiring, connector, CPP switch
39	Brake pedal position (BPP) switch – circuit malfunction	Wiring, connector, BPP switch
40	Brake pedal position (BPP) switch/throttle position (TP) sensor(s) – incorrect signal	Wiring, connector, BPP switch, TP sensor(s), ECM
42	Steering wheel multifunction switch – incorrectly coded	Wiring, connector, steering wheel multifunction switch
43	Steering wheel multifunction switch – malfunction	Wiring, spiral cable, steering wheel multifunction switch, ECM



**BMW**

Model: 3 Series/Compact (E36) • 3 Series (E46) • 520i (E34)  
5 Series (E39) • 7 Series (E38) • Z3

**Engine management**

Scanner type	Fault location	Probable cause
45	Steering wheel multifunction switch – incorrect signal	Wiring, spiral cable, steering wheel multifunction switch, ECM
46	Fuel level signal	Fuel level low, wiring, fuel gauge tank sensor
49	Battery voltage – too low	Wiring, alternator, battery
50	Injector, cyl. 2 – circuit malfunction	Wiring, injector
	MS42: Evaporative emission (EVAP) canister purge valve – malfunction	Wiring, connector(s), EVAP canister purge valve
51	MS41: Evaporative emission (EVAP) canister purge valve – malfunction	Wiring, connector(s), EVAP canister purge valve
	Evaporative emission (EVAP) canister purge valve – malfunction	Wiring, connector(s), EVAP canister purge valve
52	Fuel pump relay – malfunction	Wiring, connector(s), fuel pump relay
	MS42: Exhaust gas control solenoid – malfunction	Wiring, connector, exhaust gas control solenoid
53	MS41: Exhaust gas control solenoid – malfunction	Wiring, connector, exhaust gas control solenoid
	Oxygen sensor heater – circuit malfunction	Wiring, connector, HO2S
	MS42: Idle air control (IAC) valve – circuit malfunction	Wiring, connector, IAC valve
55	MS41: Idle speed control (ISC) actuator/idle air control (IAC) valve – malfunction	Wiring, connector(s), ISC actuator/IAC valve, ECM
	Oxygen sensor heater 2 – circuit malfunction	Wiring, connector, engine control relay, HO2S, ECM
	MS42: Oxygen sensor heater 1, bank 2 – circuit malfunction	Wiring, connector, engine control relay, HO2S, ECM
56	Ignition signal resistor – defective	Wiring, ignition signal resistor
57	Knock sensor (KS) 1 – defective	Wiring, connector, KS incorrectly tightened, KS
59	Knock sensor (KS) 2 – defective	Wiring, connector, KS incorrectly tightened, KS
61	MS42: Oxygen sensor heater 2, bank 2 – circuit malfunction	Wiring, connector, engine control relay, HO2S, ECM
62	Ignition circuit – secondary circuit	Wiring, ignition coil(s)
	MS42: Secondary air injection (AIR) solenoid – defective	Wiring, connector, AIR solenoid
63	MS41: Secondary air injection (AIR) solenoid – defective	Wiring, connector, AIR solenoid
	Knock sensor (KS) 2 – defective	Wiring, connector, KS incorrectly tightened, KS
64	Knock sensor (KS) 1 – defective	Wiring, connector, KS incorrectly tightened, KS
65	Camshaft position (CMP) sensor – circuit malfunction	Wiring, connector, CMP sensor
	MS42: Camshaft position (CMP) sensor 1 – circuit malfunction	Wiring, connector, CMP sensor
68	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – incorrect signal	Wiring, connector(s), MAF sensor/VAF sensor
	MS42: Evaporative emission (EVAP) canister purge valve – electrical fault	Wiring, connector, EVAP canister purge valve



Scanner type	Fault location	Probable cause
69	MS41: Evaporative emission (EVAP) canister purge valve – electrical fault	Wiring, connector, EVAP canister purge valve
	MS40/42: Fuel pump relay – malfunction	Wiring, connector(s), fuel pump relay
74	AC compressor clutch relay – malfunction	Wiring, AC compressor clutch relay
75	Heated oxygen sensor (HO2S) – circuit malfunction	Wiring, connector(s), HO2S
76	MS41: Heated oxygen sensor (HO2S) 1 – circuit malfunction	Wiring, connector(s), HO2S, ECM
	Heated oxygen sensor (HO2S) 2 – circuit malfunction	Wiring, connector(s), HO2S, ECM
77	Throttle position (TP) sensor – defective	Wiring, connector(s), TP sensor
79	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – incorrect/no signal	Wiring, CKP sensor/RPM sensor
	MS42: Oxygen sensor heater 2, bank 1 – circuit malfunction	Wiring, connector, engine control relay, HO2S, ECM
80	Engine control module (ECM)/ABS control module communication, ASR system	Wiring, electrical interference, ABS trouble code(s) stored, ECM
81	Engine coolant temperature (ECT) sensor – malfunction	Wiring, connector(s), ECT sensor
82	MS41: Engine control module (ECM)/ABS control module communication, ASR system	Wiring, electrical interference, ABS trouble code(s) stored, ECM
	Engine control module (ECM)/ABS control module communication, ASR system	Wiring, electrical interference, ABS trouble code(s) stored, ECM
83	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – circuit malfunction	Wiring, connector, CKP sensor/RPM sensor
84	Camshaft position (CMP) sensor – range/performance problem	Wiring, CMP sensor
85	Intake air temperature (IAT) sensor – malfunction	Wiring, connector(s), IAT sensor
97	Evaporative emission (EVAP) canister purge valve – mechanical fault	EVAP canister purge valve
98	Idle speed control (ISC) actuator/idle air control (IAC) valve – mechanical fault	ISC actuator/IAC valve
99	Heated oxygen sensor (HO2S) – range/performance problem	Wiring, intake/exhaust leak, fuel level low, fuel pressure, evaporative emission (EVAP) canister purge valve, injector(s), HO2S, ECM
100	Engine control module (ECM) – defective	Disconnect ECM multi-plug for at least 10 min. – check if trouble code reappears before replacing ECM
103	Camshaft position (CMP) actuator 1 – malfunction	Wiring, connector(s), mechanical fault, engine control relay, CMP actuator, ECM
104	Camshaft position (CMP) actuator 2 – malfunction	Wiring, connector(s), mechanical fault, engine control relay, CMP actuator, ECM
105	Camshaft position (CMP) actuator 1 – malfunction	Wiring, connector(s), mechanical fault, engine control relay, CMP actuator, ECM
106	Camshaft position (CMP) actuator 2 – malfunction	Wiring, connector(s), mechanical fault, engine control relay, CMP actuator, ECM
109	Throttle control unit – range/performance problem	Wiring, connector(s), throttle control unit, ECM



**BMW**

Model: 3 Series/Compact (E36) • 3 Series (E46) • 520i (E34)  
5 Series (E39) • 7 Series (E38) • Z3

**Engine management**

<b>Scanner type</b>	<b>Fault location</b>	<b>Probable cause</b>
110	Throttle control unit/accelerator pedal position (APP) sensor 1 – range/performance problem	Wiring, connector(s), throttle control unit, ECM
111	Throttle control unit/accelerator pedal position (APP) sensor 2 – range/performance problem	Wiring, connector(s), throttle control unit, ECM
112	Throttle control unit/throttle position (TP) sensor 1 – range/performance problem	Wiring, connector(s), throttle control unit, ECM
113	Throttle control unit/throttle position (TP) sensor 2 – range/performance problem	Wiring, connector(s), throttle control unit, ECM
114	Throttle control unit/throttle position motor – circuit malfunction	Wiring, connector(s), throttle control unit, ECM
115	Throttle control unit/APP sensor 1/ TP sensor 1 – supply voltage	Wiring, connector(s), throttle control unit, ECM
116	Throttle control unit/APP sensor 1/ TP sensor 1 – supply voltage	Wiring, connector(s), throttle control unit, ECM
117	Throttle control unit/APP sensor 1/2 – malfunction	Wiring, connector(s), throttle control unit, ECM
118	Throttle control unit/TP sensor 1/2 – malfunction	Wiring, connector(s), throttle control unit, ECM
119	Throttle control unit/throttle valve – mechanical fault	Throttle valve, throttle control unit
120	Throttle control unit – malfunction	Wiring, connector(s), throttle control unit, ECM
122	Engine oil temperature sensor – malfunction	Wiring, connector(s), engine oil temperature sensor, ECM
123	Engine cooling system – circuit malfunction	Wiring, connector(s), engine coolant thermostat, ECT sensor, engine coolant blower motor temperature sensor, engine coolant blower motor, ECM
124	Intake manifold air control solenoid – circuit malfunction	Wiring, connector(s), intake manifold air control solenoid, ECM
125	Engine coolant blower motor – circuit malfunction	Wiring, connector(s), engine coolant blower motor, ECM
128	Immobilizer control module – malfunction	Wiring, connector(s), immobilizer control module, ECM
130	CAN data bus, ABS/ASR – defective	Wiring, connector(s), ABS control module/traction control module
131	CAN data bus, instrumentation – defective	Wiring, connector(s), instrument panel
132	CAN data bus, instrumentation – defective	Wiring, connector(s), instrument panel
133	CAN data bus, ABS/ASR – defective	Wiring, connector(s), ABS control module/traction control module
140	Fuel system leak detection pump motor – malfunction	Wiring, connector(s), fuel system leak detection pump motor, ECM
141	Fuel system leak detection pump motor – malfunction	Wiring, connector(s), fuel system leak detection pump motor, ECM
142	Fuel system leak detection pump motor – malfunction	Wiring, connector(s), fuel system leak detection pump motor, ECM
143	Fuel system leak detection pump motor – hose(s) blocked	Hose(s), fuel system leak detection pump motor
144	Fuel system leak detection pump motor – leak detected	Hose(s), fuel system leak detection pump motor
145	Fuel system leak detection pump motor – leak detected	Hose(s), fuel system leak detection pump motor



Scanner type	Fault location	Probable cause
146	Fuel system leak detection pump motor – leak detected	Hose(s), fuel system leak detection pump motor
149	Mass air flow (MAF) sensor/throttle valve – plausibility	Wiring, connector(s), MAF sensor, throttle control unit/throttle valve, ECM
150	Heated oxygen sensor (HO2S) 1, bank 1 – high voltage	Wiring, connector(s), HO2S
151	Heated oxygen sensor (HO2S) 1, bank 1 – low voltage	Wiring, connector(s), HO2S
152	Heated oxygen sensor (HO2S) 1, bank 1 – no signal	Wiring, connector(s), HO2S
153	Heated oxygen sensor (HO2S) 1, bank 2 – high voltage	Wiring, connector(s), HO2S
154	Heated oxygen sensor (HO2S) 1, bank 2 – low voltage	Wiring, connector(s), HO2S
155	Heated oxygen sensor (HO2S) 1, bank 2 – no signal	Wiring, connector(s), HO2S
156	Heated oxygen sensor (HO2S) 2, bank 1 – high voltage	Wiring, connector(s), HO2S
157	Heated oxygen sensor (HO2S) 2, bank 1 – low voltage	Wiring, connector(s), HO2S
159	Heated oxygen sensor (HO2S) 2, bank 2 – high voltage	Wiring, connector(s), HO2S
160	Heated oxygen sensor (HO2S) 2, bank 2 – low voltage	Wiring, connector(s), HO2S
168	Engine coolant thermostat – mechanical fault	Engine coolant thermostat
169	Throttle control unit – malfunction	Wiring, connector(s), mechanical fault, throttle control unit, ECM
170	Engine control module (ECM)/throttle control unit – plausibility	Wiring, connector(s), mechanical fault, throttle control unit, ECM
171	Throttle control unit – plausibility	Wiring, connector(s), throttle control unit, ECM
172	Throttle control unit/accelerator pedal position (APP) sensor 1/2 – circuit malfunction	Wiring short to earth/positive, connector(s), throttle control unit, ECM
172	Throttle control unit/throttle position (TP) sensor 1/2 – circuit malfunction	Wiring short to earth/positive, connector(s), throttle control unit, ECM
173	Throttle control unit/throttle position (TP) sensor 1/2 – circuit malfunction	Wiring short to earth/positive, connector(s), throttle control unit, ECM
174	Throttle control unit/throttle position (TP) sensor 1/2 – malfunction	Wiring, connector(s), throttle control unit, ECM
175	Throttle control unit – malfunction	Wiring, connector(s), throttle control unit, ECM
176	Throttle control unit/accelerator pedal position (APP) sensor 2 – malfunction	Wiring, connector(s), throttle control unit, ECM
186	Heated oxygen sensor (HO2S) 1, bank 1 – malfunction	Wiring, connector(s), HO2S
187	Heated oxygen sensor (HO2S) 1, bank 2 – malfunction	Wiring, connector(s), HO2S
188	Heated oxygen sensor (HO2S) 1, bank 1 – range/performance problem	Wiring, connector(s), HO2S

**BMW**

Model: 3 Series/Compact (E36) • 3 Series (E46) • 520i (E34)  
5 Series (E39) • 7 Series (E38) • Z3

**Engine management**

Scanner type	Fault location	Probable cause
189	Heated oxygen sensor (HO2S) 1, bank 2 – range/performance problem	Wiring, connector(s), HO2S
190	Heated oxygen sensor (HO2S) 2, bank 1 – range/performance problem	Wiring, connector(s), HO2S
191	Heated oxygen sensor (HO2S) 2, bank 2 – range/performance problem	Wiring, connector(s), HO2S
200	Engine control module (ECM) – defective	Disconnect ECM multi-plug for at least 5 min. – check if trouble code reappears before replacing ECM
201	MS41: Heated oxygen sensor (HO2S) 1 – circuit malfunction	Wiring, connector(s), HO2S
	Heated oxygen sensor (HO2S) 2 – circuit malfunction	Wiring, connector(s), HO2S
202	Heated oxygen sensor (HO2S), cyl. 1-3 – range/performance problem	Wiring, intake/exhaust leak, fuel level low, fuel pressure, evaporative emission (EVAP) canister purge valve, injector(s), HO2S, ECM
203	Heated oxygen sensor (HO2S), cyl. 4-6 – range/performance problem	Wiring, intake/exhaust leak, fuel level low, fuel pressure, evaporative emission (EVAP) canister purge valve, injector(s), HO2S, ECM
204	Idle speed control (ISC) actuator/idle air control (IAC) valve – idle speed incorrect	Intake leak, ISC actuator/IAC valve, TP sensor, throttle valve
208	Immobilizer control module/engine control module (ECM) – plausibility	Wiring, immobilizer control module, ECM
209	Immobilizer control module – incorrect signal	Wiring, incorrectly coded, immobilizer control module
210	Misfire detected – more than 2 cylinders	Wiring, ignition coils, spark plugs, ignition signal resistor, ECM
211	Idle speed control (ISC) actuator/idle air control (IAC) valve – mechanical fault	ISC actuator/IAC valve
212	Camshaft position (CMP) actuator – mechanical fault	Camshaft timing mechanism, CMP actuator
214	Vehicle speed sensor (VSS) – signal	Wiring, ECM/ABS control module communication, electrical interference, ABS trouble code(s) stored, ECM
215	Engine control module (ECM)/ABS control module communication – plausibility	Wiring, electrical interference, ABS trouble code(s) stored, ECM
	MS42: Heated oxygen sensor (HO2S) 2, bank 1 – no signal	Wiring, connector(s), HO2S
216	CAN data bus, TCM – signal	Wiring, transmission range (TR) switch, electrical interference, TCM, ECM
	MS42: Heated oxygen sensor (HO2S) 2, bank 2 – no signal	Wiring, connector(s), HO2S
217	CAN data bus, TCM – no data transmission	Wiring, electrical interference, TCM
218	CAN data bus, ECM	Wiring
219	CAN data bus, ECM	Wiring
220	Heated oxygen sensor (HO2S) 2, bank 1 – malfunction	Wiring, connector(s), HO2S
221	Heated oxygen sensor (HO2S) 2, bank 2 – malfunction	Wiring, connector(s), HO2S





Scanner type	Fault location	Probable cause
222	Lambda regulation – defective	Engine coolant temperature (ECT) sensor, oxygen sensor heater circuit, HO2S, ECM
	MS42: CAN data bus, instrument panel/engine coolant temperature – plausibility	Wiring, instrument panel, engine coolant temperature (ECT) sensor, instrument panel
223	Heated oxygen sensor (HO2S) 2, bank 1 – malfunction	Wiring, connector(s), HO2S
224	Heated oxygen sensor (HO2S) 2, bank 1 – malfunction	Wiring, connector(s), HO2S
225	Heated oxygen sensor (HO2S) control, bank 1 – plausibility	Wiring, connector(s), intake/exhaust leak, catalytic converter, HO2S, ECM
226	Heated oxygen sensor (HO2S) control, bank 2 – plausibility	Wiring, connector(s), intake/exhaust leak, catalytic converter, HO2S, ECM
227	Mixture control (MC), cyl. 1-3 – range/performance problem	Wiring, fuel level low, fuel pressure, intake/exhaust leak, MAF sensor/MAF sensor, injector(s), HO2S, EVAP canister purge valve, ECT sensor, ECM
228	Mixture control (MC), cyl. 4-6 – range/performance problem	Wiring, fuel level low, fuel pressure, intake/exhaust leak, MAF sensor/MAF sensor, injector(s), HO2S, EVAP canister purge valve, ECT sensor, ECM
229	Heated oxygen sensor (HO2S) 1 – range/performance problem	Wiring, intake/exhaust leak, fuel level low, fuel pressure, EVAP canister purge valve, injector(s), HO2S, ECM
	MS42: Heated oxygen sensor (HO2S) 1, bank 1 – range/performance problem	Wiring, connector(s), intake/exhaust leak, fuel level low, fuel pressure, EVAP canister purge valve, injector(s), HO2S, ECM
230	Heated oxygen sensor (HO2S) 2 – range/performance problem	Wiring, intake/exhaust leak, fuel level low, fuel pressure, EVAP canister purge valve, injector(s), HO2S, ECM
	MS42: Heated oxygen sensor (HO2S) 1, bank 2 – range/performance problem	Wiring, connector(s), intake/exhaust leak, fuel level low, fuel pressure, EVAP canister purge valve, injector(s), HO2S, ECM
231	Heated oxygen sensor (HO2S) 1 – malfunction	Wiring, connector(s), HO2S
	MS42: Heated oxygen sensor (HO2S) 1, bank 1 – malfunction	Wiring, connector(s), HO2S
232	Heated oxygen sensor (HO2S) 2 – malfunction	Wiring, HO2S
	MS42: Heated oxygen sensor (HO2S) 1, bank 2 – malfunction	Wiring, connector(s), HO2S
233	Catalytic converter system, bank 1 – efficiency	Wiring, HO2S, ECM
234	Catalytic converter system, bank 2 – efficiency	Wiring, HO2S, ECM
235	Heated oxygen sensor (HO2S) control, bank 1 – malfunction	Wiring, connector(s), intake/exhaust leak, catalytic converter, HO2S, ECM
236	Heated oxygen sensor (HO2S) control, bank 2 – malfunction	Wiring, connector(s), intake/exhaust leak, catalytic converter, HO2S, ECM
238	Combustion failure – cyl. 1	Wiring, ignition/fuel system, ECM
239	Combustion failure – cyl. 2	Wiring, ignition/fuel system, ECM
240	Combustion failure – cyl. 3	Wiring, ignition/fuel system, ECM
241	Combustion failure – cyl. 4	Wiring, ignition/fuel system, ECM
242	Combustion failure – cyl. 5	Wiring, ignition/fuel system, ECM
243	Combustion failure – cyl. 6	Wiring, ignition/fuel system, ECM
244	Engine speed (RPM) sensor/crankshaft position (CKP) sensor – circuit malfunction	Wiring, connector, mechanical fault, RPM sensor/CKP sensor, ECM



**BMW**Model: 3 Series/Compact (E36) • 3 Series (E46) • 520i (E34)  
5 Series (E39) • 7 Series (E38) • Z3**Engine management**

Scanner type	Fault location	Probable cause
245	Secondary air injection (AIR) system – bank 1	Wiring, connector(s), AIR pump relay, AIR solenoid
246	Secondary air injection (AIR) system – bank 2	Wiring, connector(s), AIR pump relay, AIR solenoid
247	Secondary air injection (AIR) solenoid – mechanical fault	AIR solenoid
248	Heated oxygen sensor (HO2S) 2, bank 1 – malfunction	Wiring, connector(s), HO2S
249	Heated oxygen sensor (HO2S) 2, bank 2 – malfunction	Wiring, connector(s), HO2S
250	Fuel tank vent valve – malfunction	Wiring, connector(s), fuel tank vent valve, ECM
251	Fuel tank vent system – malfunction	Wiring, hoses, fuel tank vent valve
252	Fuel tank vent system – malfunction	Wiring, hoses, fuel tank vent valve
253	Evaporative emission (EVAP) canister purge valve – mechanical fault	EVAP canister purge valve
254	Fuel tank vent system – leak detected	Hose(s), fuel tank vent valve
255	Evaporative emission (EVAP) canister purge valve – mechanical fault	EVAP canister purge valve



Model: 3 Series/Compact (E36) • 3 Series (E46)  
5 Series (E39) • 7 Series (E38) • Z3  
8 Series (E31) • X5 4,4 (E53)

Year: 1991-04

Engine code: 16 4E3, 19 4E/S 1, 20 6S 2/3/4, 25 6S 3/4, 28 6S 2, 35  
8S 1/2, 35 8S 2, 44 8S 1/2, 54 12 1/2

System: Siemens MS41/42 • Bosch Motronic M5.2  
Bosch BMS46 • Bosch ME7.2

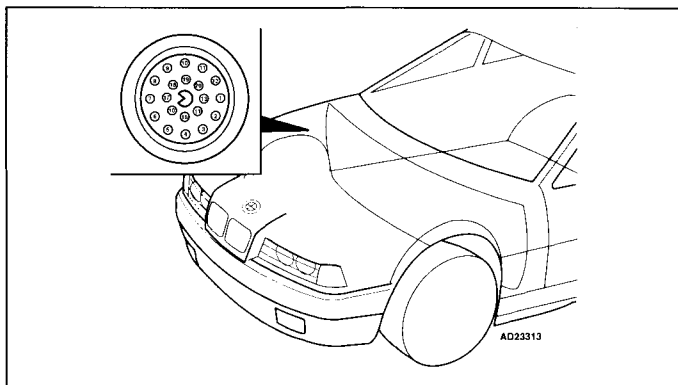
Trouble codes: EOBD type

**BMW**

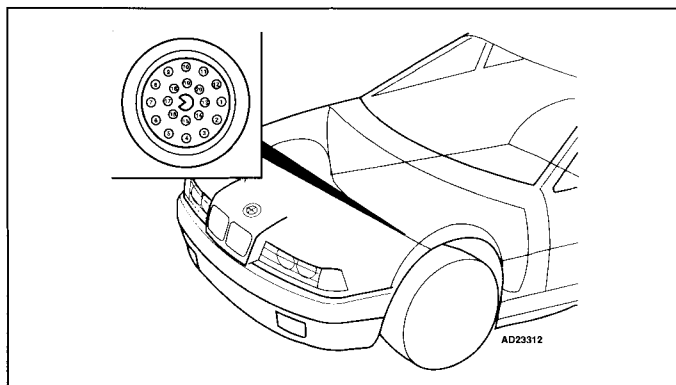


Engine management

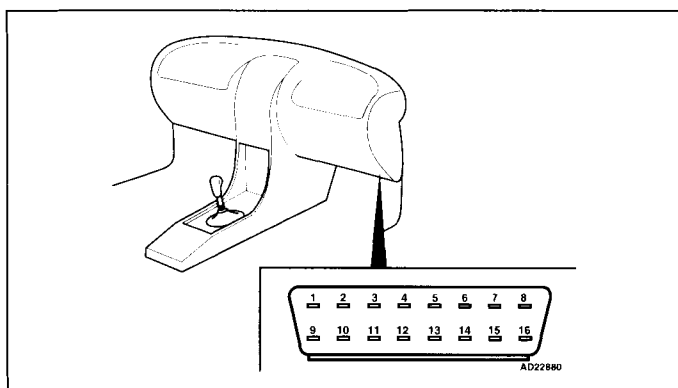
## Data link connector (DLC) locations



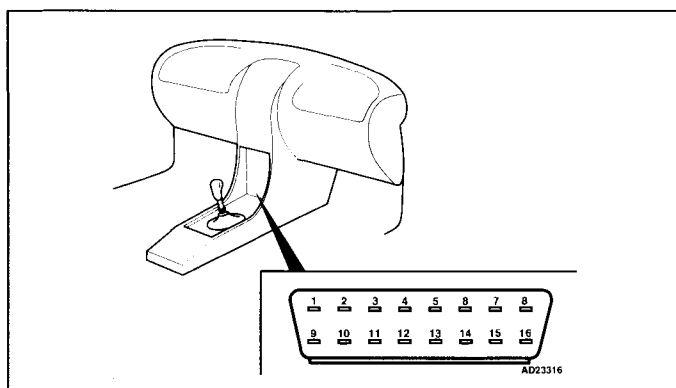
Z3, 3 Series, 5 Series, 7 Series, 8 Series – →1999 –  
engine bay RH side



3 Series Compact, X5 – engine bay LH side



3 Series (E46), Z3, 5 Series (E39), X5 – 2000→



7 Series – 2000→

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**NOTE:** Some models may have both DLCs fitted. DO NOT open 20-pin DLC while using 16-pin DLC.

**BMW**Model: 3 Series/Compact (E36) • 3 Series (E46) • 5 Series (E39)  
7 Series (E38) • Z3 • 8 Series (E31) • X5 4,4i (E53)**Engine management****Trouble code identification**

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1140	Mass air flow (MAF) sensor/throttle position (TP) sensor communication – plausibility	Wiring, MAF sensor/TP sensor, ECM
P1161	Engine oil temperature (EOT) sensor – range/performance problem	Wiring, connector, EOT sensor, ECM
P1174	Fuel trim (FT), bank 1 – range/performance problem	Wiring, connectors, intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor, EVAP canister purge valve, ECM
P1176	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Wiring, HO2S
P1186	Heated oxygen sensor (HO2S) 2, bank 2 – heater circuit malfunction	Wiring, connector, fuel pump relay, HO2S
P1188	Fuel trim (FT), bank 1 – range/performance problem	Wiring, connectors, intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor, EVAP canister purge valve, ECM
P1270	Engine torque difference bank 1 to 2 – malfunction	Trouble code(s) stored, intake leak, mechanical fault, electronic throttle system (ETS)
P1383	Ignition circuit – malfunction	Wiring, connectors, spark plug(s), ignition coil(s)
P1386	Knock sensor(s) (KS) – circuit malfunction	Wiring, connector, KS incorrectly tightened, KS
P1396	Crankshaft position (CKP) sensor/engine speed (RPM) sensor 1 & 2 – faulty signal	CKP/RPM sensor(s), excessive crankshaft clearance, flywheel ring gear damaged
P1423	Secondary air injection (AIR) system, bank 1 – insufficient flow detected	Hose connection(s), AIR valve, AIR pump
P1453	Secondary air injection (AIR) system, bank 1 – electrical fault	Wiring, connectors, AIR pump relay, AIR pump
P1470	Evaporative emission (EVAP) canister purge valve – ECM output stage	Wiring, EVAP canister purge valve, ECM
P1475	Evaporative emission (EVAP) system – malfunction	Wiring, connector, EVAP canister purge valve relay, EVAP canister purge valve, ECM
P1509	Idle speed control (ISC) actuator – malfunction	Wiring, ISC actuator
P1511	Intake manifold air control solenoid – circuit malfunction	Wiring, connector, intake manifold air control solenoid
P1519	MS40/41/42/46/M5.2: Inlet camshaft control system, end position – plausibility	Wiring, connector, camshaft position (CMP) sensor, crankshaft position (CKP) sensor, ECM
	ME7.2: Inlet camshaft control system, bank 1 – plausibility	Wiring, connector, mechanical fault, camshaft position (CMP) actuator, camshaft position (CMP) sensor(s), crankshaft position (CKP) sensor, ECM
P1520	Exhaust camshaft control system, end position – plausibility	Wiring, connector, camshaft position (CMP) sensor, crankshaft position (CKP) sensor, ECM
P1522	Inlet camshaft control system, camshaft position – plausibility	Wiring, connector, camshaft position (CMP) actuator, ECM
	ME7.2: Inlet camshaft control system, bank 2 – plausibility	Wiring, connector, mechanical fault, camshaft position (CMP) actuator, camshaft position (CMP) sensor(s), crankshaft position (CKP) sensor, ECM
P1523	Exhaust camshaft control system, camshaft position – plausibility	Wiring, connector, camshaft position (CMP) actuator, ECM
P1525	Camshaft position (CMP) actuator, inlet camshaft – ECM output stage	Wiring, connector, CMP actuator, ECM
	ME7.2: Inlet camshaft control system, bank 1 – ECM output stage	Wiring, connectors, CMP actuator, ECM

Model: 3 Series/Compact (E36) • 3 Series (E46) • 5 Series (E39)  
7 Series (E38) • Z3 • 8 Series (E31) • X5 4,4i (E53)

**BMW**



Engine management

EOBD type	Fault location	Probable cause
P1526	Inlet camshaft control system, bank 2 – ECM output stage	Wiring, connectors, CMP actuator, ECM
P1529	Camshaft position (CMP) actuator, exhaust camshaft – ECM output stage	Wiring, connector, CMP actuator, ECM
P1550	Idle speed control (ISC) actuator – malfunction	Wiring, ISC actuator
P1585	Random/multiple cylinder(s) – misfire detected	Fuel level low, ignition/fuel system, injector(s), intake leak, mechanical fault
P1589	Knock sensor(s) (KS) – circuit malfunction	Wiring, connector, KS incorrectly tightened, KS
P1593	Intake manifold air control solenoid – ECM output stage	Wiring, intake manifold air control solenoid, ECM
P1622	Engine coolant temperature (ECT) sensor, ECM controlled cooling system – ECM output stage	Wiring, ECT sensor, ECM
P1690	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, MIL



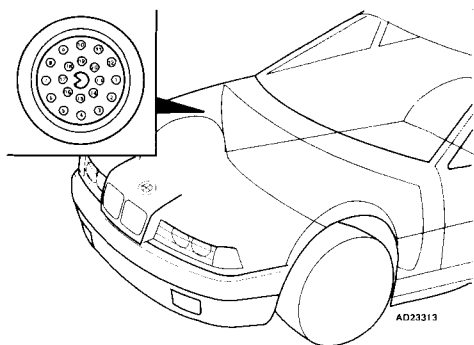


# BMW

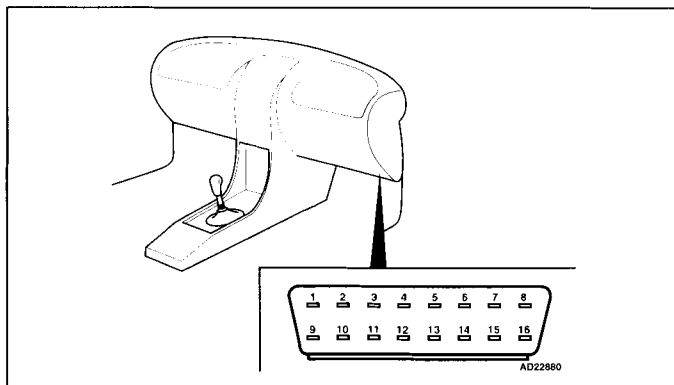
Model: 3 Series (E36) • 5 Series (E34) • 5 Series (E39)  
7 Series (E32/E38) • 8 Series (E31)  
Year: 1987-02  
System: GS 1.2/21/22/26/27 (4 HP-22/24)  
GS 4.14/15/16/19/21 (A4S 310R)  
GS 7.1 (A5S 310Z) • GS 9.2 (A5S 560Z)

Transmission

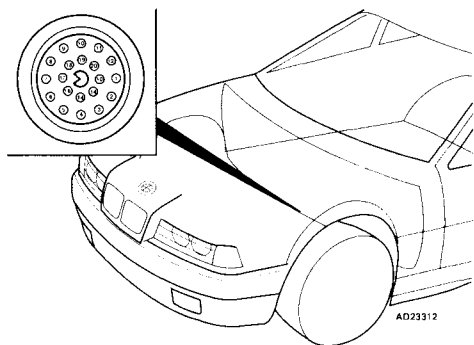
## Data link connector (DLC) locations



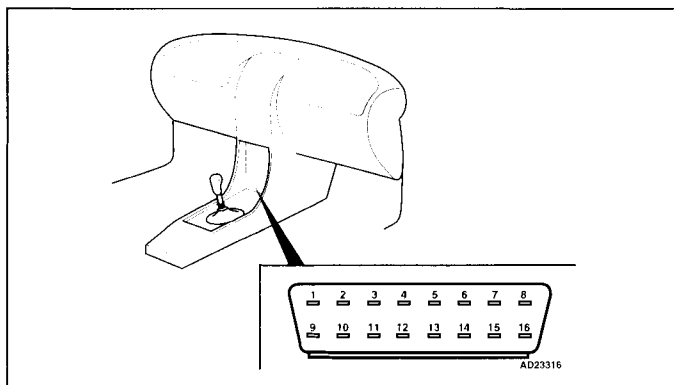
3 Series, 5 Series – →2000, 7 Series (E38) – →2000,  
8 Series – engine bay RH side



5 Series (E39) – 2000 →



7 Series (E32), Compact – engine bay LH side



7 Series (E38) – 2000 →

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The transmission control module (TCM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).



## Trouble code identification

Scanner type	Fault location	Probable cause
1	Transmission control module (TCM) – internal fault	TCM
1 <b>1</b>	Transmission park position interlock solenoid – electrical fault	Wiring, solenoid valve
1 <b>2</b>	Pressure control (PC) solenoid 2 – electrical fault	Wiring, solenoid valve
2	Transmission control module (TCM) – EPROM error	TCM
2 <b>1</b>	Transmission mode selection switch – defective	Wiring, transmission mode selection switch
2 <b>3</b>	Transmission park position interlock solenoid – electrical fault	Wiring, solenoid valve
2 <b>2</b>	Transmission park position interlock solenoid – electrical fault	Wiring, solenoid valve
3	Transmission kick-down switch – defective	Wiring, transmission kick-down switch
3 <b>3</b>	Solenoid valve 5 – electrical fault	Wiring, solenoid valve
4	Transmission mode selection switch – defective	Wiring, transmission mode selection switch
4 <b>1</b>	ECM/TCM communication – ignition timing adjustment/torque reduction	Wiring, ECM
4 <b>3</b>	Torque converter clutch (TCC) lock-up solenoid – electrical fault	Wiring, solenoid valve
4 <b>2</b>	Pressure control (PC) solenoid 4 – electrical fault	Wiring, solenoid valve
5	ETS control module/TCM communication, APP sensor – signal	Wiring, APP sensor, TP sensor
5 <b>3</b>	Pressure control (PC) solenoid – electrical fault	Wiring, solenoid valve
5 <b>2</b>	Pressure control (PC) solenoid 1 – electrical fault	Wiring, solenoid valve
6	Solenoid valve 1 – electrical fault	Wiring, solenoid valve
7	Solenoid valve 2 – electrical fault	Wiring, solenoid valve
8 <b>4</b>	Solenoid valve 1 & 2 – electrical fault	Wiring, solenoid valves
8	Transmission range (TR) switch – malfunction	Wiring, TR switch
9 <b>4</b>	Transmission park position interlock solenoid – electrical fault	Wiring, solenoid valve
9 <b>1</b>	ECM/TCM communication – injection signal	Wiring, ECM
9	Transmission range (TR) switch – malfunction	Wiring, TR switch
10	Solenoid valve 1/transmission park position interlock solenoid – electrical fault	Wiring, solenoid valves
11	Solenoid valve 2/transmission park position interlock solenoid – electrical fault	Wiring, solenoid valves
11 <b>1</b>	ECM/TCM communication – no RPM signal	Wiring
12 <b>4</b>	Solenoid valve 1 & 2/transmission park position interlock solenoid – electrical fault	Wiring, solenoid valves
12	Transmission mode selection switch – defective	Wiring, transmission mode selection switch
13	Torque converter clutch (TCC) lock-up solenoid – electrical fault	Wiring, solenoid valve
14	Solenoid valve 1/torque converter clutch (TCC) lock-up solenoid – electrical fault	Wiring, solenoid valve(s)
15	Solenoid valve 2/torque converter clutch (TCC) lock-up solenoid – electrical fault	Wiring, solenoid valve(s)
16	Solenoid valve 1 & 2/torque converter clutch (TCC) lock-up solenoid – electrical fault	Wiring, solenoid valve(s)
16 <b>3</b>	Output shaft speed (OSS)/engine speed signal – plausibility	Wiring, output shaft speed (OSS) sensor, RPM sensor

**BMW**Model: 3 Series (E36) • 5 Series (E34) • 5 Series (E39)  
7 Series (E32/E38) • 8 Series (E31)**Transmission**

Scanner type	Fault location	Probable cause
16 <b>2</b>	Turbine shaft speed (TSS) sensor – no signal	Wiring, TSS sensor
17	Transmission park position interlock solenoid/torque converter clutch (TCC) lock-up solenoid – electrical fault	Wiring, solenoid valve(s)
18 <b>4</b>	Solenoid valve 1/transmission park position interlock solenoid/torque converter clutch (TCC) lock-up solenoid – electrical fault	Wiring, solenoid valve(s)
18	Transmission kick-down switch – defective	Wiring, transmission kick-down switch
19 <b>4</b>	Solenoid valve 2/transmission park position interlock solenoid/torque converter clutch (TCC) lock-up solenoid – electrical fault	Wiring, solenoid valve(s)
19	ECM/TCM communication – ASR function	Wiring, trouble code(s) stored in other system(s)
20	Solenoid valves/pressure control (PC) solenoid – supply voltage	Wiring, solenoid valves
20 <b>1</b>	ECM/TCM communication – no VSS/RPM signal above approximately 2700 rpm	Wiring
21	ECM/TCM communication – no RPM signal	Wiring
22 <b>4</b>	Pressure control (PC) solenoid – electrical fault	Wiring, solenoid valve
22	Transmission fluid temperature (TFT) sensor – defective	Wiring, TFT sensor, transmission overloaded
23	ECM/TCM communication – ignition timing adjustment	Wiring
23 <b>1</b>	Transmission range (TR) switch – malfunction	Wiring, TR switch
24	ECM/TCM communication, no VSS/RPM signal – downshift protection	Wiring
25	ECM/TCM communication – maximum RPM exceeded	Wiring, ECM
26 <b>4</b>	ECM/TCM communication – injection signal	Wiring, ECM
26	Battery – supply voltage	Wiring, battery, alternator
27	Output shaft speed (OSS) sensor – no signal	Wiring to VSS, RPM sensor, TCC lock-up solenoid
28 <b>5</b>	Transmission warning lamp – circuit malfunction	Wiring, connector, instrument panel
28 <b>1</b>	Battery – supply voltage	Wiring, battery, alternator
29 <b>5</b>	Transmission control module (TCM) – internal fault	TCM
29	Pressure control (PC) solenoid 3 – electrical fault	Wiring, solenoid valve
30	Battery – supply voltage	Wiring, battery, alternator
30 <b>■</b>	Transmission kick-down switch – defective	Wiring, transmission kick-down switch
30 <b>6</b>	Solenoid valve 1 – electrical fault	Wiring, solenoid valve
31	Transmission range (TR) switch – malfunction	Wiring, TR switch
31 <b>■</b>	Solenoid valve 4 – electrical fault	Wiring, solenoid valve
32	Solenoid valve 3 – electrical fault	Wiring, solenoid valve
33	Solenoid valve 2 – electrical fault	Wiring, solenoid valve
35	ECM/TCM communication – TP signal	Wiring between ECM/TCM or TP sensor/ECM
36	Transmission range (TR) switch – malfunction	Wiring, TR switch
36 <b>2</b>	Transmission range (TR) switch – open circuit/short to earth	Wiring, TR switch
37	Battery – supply voltage low/high	Wiring, battery
38	Torque converter clutch (TCC) lock-up solenoid – electrical fault	Wiring, solenoid valve
40	Pressure control (PC) solenoid – electrical fault	Wiring, solenoid valve





Scanner type	Fault location	Probable cause
40 <b>3</b>	ECM/TCM communication – ignition timing adjustment/torque reduction	Wiring, ECM trouble code(s) stored
41	ECM/TCM communication – injection signal	Wiring, ECM
42	ECM/TCM communication – no VSS/RPM signal above approximately 2700 rpm	Wiring
42 <b>2</b>	Output shaft speed (OSS) sensor – malfunction	Wiring, electrical interference, OSS sensor
43	Solenoid valve 2 – electrical fault	Wiring, solenoid valve
43 <b>3</b>	ECM/TCM communication – no RPM signal	Wiring
45	Solenoid valve, brake band – electrical fault	Wiring, solenoid valve
48	Solenoid valve 1 – electrical fault	Wiring, solenoid valve
51	Pressure control (PC) solenoid 5 – electrical fault	Wiring, solenoid valve
52	Solenoid valves/pressure control (PC) solenoid – supply voltage	Wiring, solenoid valve(s)
53	Solenoid valves – supply voltage	Wiring
54 <b>1</b>	Solenoid valves – electrical fault	Earth wire
54	Battery – supply voltage low/high	Wiring, battery
55	ECM/TCM communication – TP signal	Wiring between ECM/TCM or TP sensor/ECM
100	Output shaft speed (OSS)/engine speed signal – plausibility	Solenoid valves, valve body, OSS sensor
101 <b>1</b>	ECM/TCM communication, RPM signal – downshift protection	Wiring, TCM
101	Transmission control module (TCM) – EPROM error	TCM
102 <b>1</b>	ECM/TCM communication – maximum RPM exceeded	Wiring, ECM
102	Transmission control module (TCM) – EPROM error	TCM
103	Transmission control module (TCM) – EPROM error	TCM
103 <b>3</b>	Transmission system relay – defective	Wiring, transmission system relay
103 <b>2</b>	Solenoid valves – supply voltage	Wiring, transmission system relay
104	ECM/TCM communication, ECT sensor – malfunction	Wiring, ECT sensor
104 <b>■</b>	ECM/TCM communication – maximum RPM exceeded	Wiring, ECM
105	ECM/TCM communication, TP sensor – malfunction	Wiring, TP sensor
150	CAN data bus – malfunction	Wiring, TCM
151	CAN data bus – malfunction	Wiring, TCM
152	CAN data bus, TCM	Wiring, TCM
152 <b>2</b>	CAN data bus – malfunction	Wiring, TCM
153	CAN data bus, test – malfunction	Wiring
153 <b>■</b>	CAN data bus, TCM	Wiring, TCM
155	ECM/TCM communication, engine load signal – malfunction	Wiring, MAF sensor, trouble code(s) stored in other system(s), ECM
156	ECM/TCM communication, engine torque signal – malfunction	Wiring, trouble code(s) stored in other system(s), ECM, TCM
157	ECM/TCM communication, ECT sensor – malfunction	Wiring, ECT sensor, ECM
200 <b>4</b>	ETS control module/TCM communication – no kick-down function	Wiring, APP sensor, transmission kick-down switch



**BMW**Model: 3 Series (E36) • 5 Series (E34) • 5 Series (E39)  
7 Series (E32/E38) • 8 Series (E31)**Transmission**

Scanner type	Fault location	Probable cause
200	Transmission kick-down switch – defective	Wiring, transmission kick-down switch
201 <b>4</b>	ETS control module/TCM communication – kick-down malfunction	Wiring, APP sensor, transmission kick-down switch
201	Transmission mode selection switch, S-program – malfunction	Wiring, transmission mode selection switch
202	Transmission mode selection switch, S-program – malfunction	Wiring, transmission mode selection switch
202 <b>1</b>	Transmission mode selection switch, M-program – malfunction	Wiring, transmission mode selection switch
202 <b>3</b>	Transmission mode selection switch – malfunction	Wiring, transmission mode selection switch
203	Transmission mode selection switch, M-program – malfunction	Wiring, transmission mode selection switch
203 <b>1</b>	Transmission control module (TCM), pin 10 – display indicates wrong transmission program	Wiring, connector(s), instrument panel
203 <b>3</b>	Transmission mode selection switch – malfunction	Wiring, transmission mode selection switch
204	Transmission mode selection switch – malfunction	Wiring, transmission mode selection switch
204 <b>1</b>	Transmission control module (TCM), pin 12 – display indicates wrong transmission program	Wiring, connector(s), instrument panel
204 <b>3</b>	ECM/TCM communication – ignition timing adjustment/torque reduction	Wiring, ECM
205	ECM/TCM communication – ignition timing adjustment/torque reduction	Wiring, ECM
205 <b>1</b>	Transmission mode selection switch – malfunction	Wiring, transmission mode selection switch
205 <b>3</b>	Brake pedal position (BPP) switch – defective	Wiring, BPP switch
206	Transmission warning lamp – wiring	Wiring open circuit/short to positive
206 <b>1</b>	ECM/TCM communication – ignition timing adjustment/torque reduction	Wiring, ECM
207 <b>7</b>	Transmission control module (TCM) – TP signal	Wiring, TP switch/sensor
207 <b>1</b>	AC control module/TCM communication, AC activated – gearshift malfunction	Wiring
208	Brake pedal position (BPP) switch – defective	Wiring, BPP switch
209	Transmission warning lamp – wiring	Wiring open circuit/short to positive
300	Data link connector (DLC) – no communication	Wiring
301	Transmission control module (TCM) – supply voltage	Wiring
302	Transmission range (TR) switch – range/performance problem	TR switch incorrectly adjusted
303	Transmission range (TR) switch – circuit malfunction	Wiring, fuse, supply voltage, TR switch

**1** GS 4.14/15/16/19/21 (A4S 310R)**2** GS 9.2 (A5S 560Z)**3** GS 7.1\* (A5S 310Z)**4** GS 1.2/21/22/26/27 (4 HP-22/24)**5** GS 1.21/22/26/27 (4 HP-22/24)**6** GS 7.1\* (A5S 310Z) & GS 9.2 (A5S 560Z)**7** GS 1.2/21/22/26/27 (4 HP-22/24) without ETS

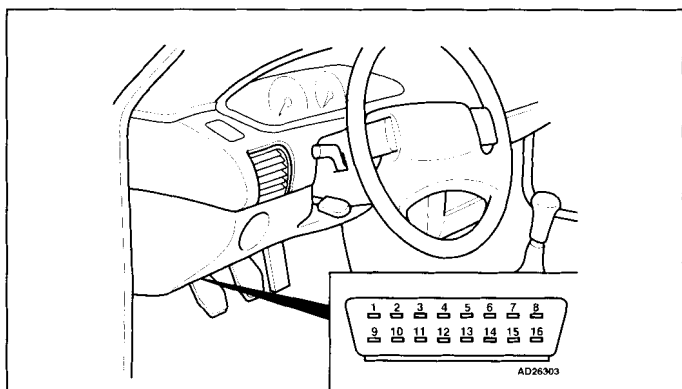
Model: Neon 2,0 • Stratus 2,0 • Stratus 2,5  
 Year: 1999-02  
 Engine code: ECB, ECC, EEB  
 System: SBEC III

**CHRYSLER**

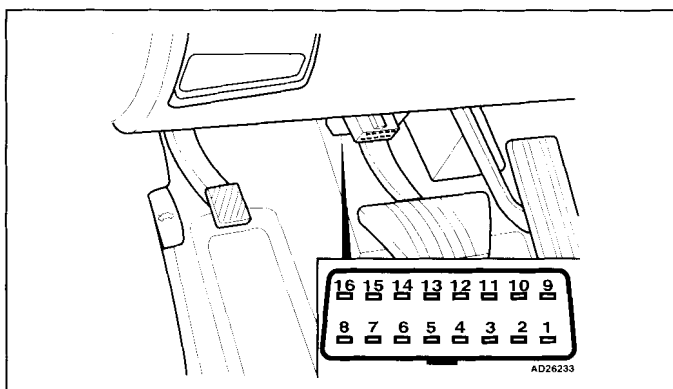


Engine management

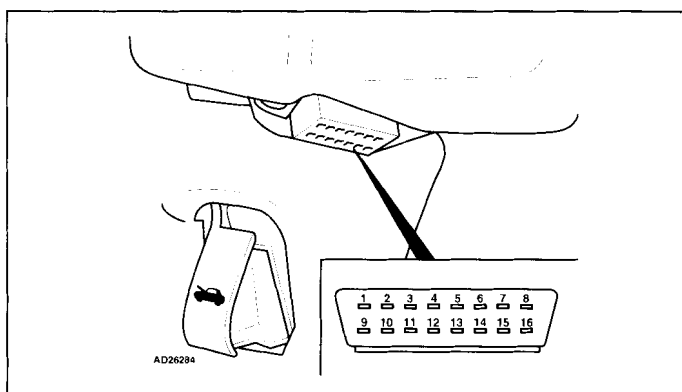
## Data link connector (DLC) locations



Neon



Stratus 2001 →



Stratus →2000

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing – →2001

- The engine control module (ECM) fault memory can only be accessed using diagnostic equipment connected to the data link connector (DLC).

### Accessing – 2001 →

- Within 5 seconds switch ignition ON-OFF-ON-OFF-ON.
- Odometer will display trouble codes.
- If no trouble codes are stored in ECM, odometer will display 'P1684' and 'done' or only 'done'.
- The engine control module (ECM) fault memory can also be accessed using diagnostic equipment connected to the data link connector (DLC).

### Erasing

- The engine control module (ECM) fault memory can only be erased using diagnostic equipment connected to the data link connector (DLC).



## Engine management

## Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1192	Intake air temperature (IAT) sensor – voltage low	Wiring, IAT sensor
P1193	Intake air temperature (IAT) sensor – voltage high	Wiring, IAT sensor
P1195	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Wiring, heating inoperative, HO2S
P1196	Heated oxygen sensor (HO2S) 1, bank 2 – slow response	Wiring, heating inoperative, HO2S
P1197	Heated oxygen sensor (HO2S) 2, bank 1 – slow response	Wiring, heating inoperative, HO2S
P1281	Engine temperature low for long period	Wiring, engine cooling system, coolant thermostat, ECT sensor
P1282	Fuel pump relay	Wiring open circuit/short circuit, fuel pump relay
P1288	Intake manifold air control solenoid (short intake manifold runner)	Wiring open circuit/short circuit, intake manifold air control solenoid (short intake manifold runner)
P1289	Intake manifold air control solenoid	Wiring open circuit/short circuit, intake manifold air control solenoid
P1294	Idle speed control (ISC) system – rpm lower/higher than expected	Wiring, air leak, throttle valve tight/sticking, IAC valve
P1295	Throttle position (TP) sensor – no 5 volt supply	Wiring, TP sensor, ECM
P1296	Manifold absolute pressure (MAP) sensor – no 5 volt supply	Wiring, MAP sensor, ECM
P1297	Manifold absolute pressure (MAP) sensor	Wiring, hose connection(s), MAP sensor
P1298	System too lean at prolonged wide open throttle	Intake/exhaust leak, MAP sensor, fuel pressure/pump, injector(s), HO2S
P1299	Manifold absolute pressure (MAP) sensor/throttle position (TP) sensor	Intake leak, hose connection(s), MAP sensor, TP sensor
P1388	Engine control relay	Wiring open circuit/short circuit, engine control relay
P1389	Engine control relay	Wiring open circuit, engine control relay
P1390	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – signal synchronisation	Timing belt loose/jumped position, CKP sensor, CMP sensor
P1391	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – intermittent signal	Wiring, poor connection, air gap, CKP sensor, CMP sensor
P1398	Engine control module (ECM) – misfire detection limit reached	Wiring, poor connection, CKP sensor
P1403	Exhaust gas recirculation (EGR) valve position sensor – no 5 volt supply	Wiring, ECM
P1478	Battery ambient temperature sensor	Wiring, battery ambient temperature sensor
P1486	Evaporative emission (EVAP) system – blockage detected	Hose connection(s), hose blocked/trapped, EVAP canister
P1488	Engine control module (ECM) – auxiliary 5 volt output low	Wiring, ECM
P1489	Engine coolant blower motor relay – high speed	Wiring open circuit/short circuit, engine coolant blower motor relay – high speed



<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1490	Engine coolant blower motor relay – low speed	Wiring open circuit/short circuit, engine coolant blower motor relay – low speed
P1491	Engine coolant blower motor relay – circuit malfunction	Wiring open circuit/short circuit, engine coolant blower motor relay
P1492	Battery ambient temperature sensor – voltage high	Wiring, battery ambient temperature sensor
P1493	Battery ambient temperature sensor – voltage low	Wiring, battery ambient temperature sensor
P1494	Evaporative emission (EVAP) leak detection pump – pressure switch	Wiring, hose leak/blockage, EVAP leak detection pump
P1495	Evaporative emission (EVAP) leak detection pump solenoid	Wiring open circuit/short circuit, hose leak/blockage, EVAP leak detection pump solenoid
P1496	Engine control module (ECM) – 5 volt output low	ECM
P1594	Alternator – voltage high	Wiring, battery, alternator
P1595	Cruise control	Wiring open circuit/short circuit, hoses, cruise control master switch, cruise control vacuum switching valve
P1596	Cruise control master switch – high voltage	Wiring, cruise control master switch
P1597	Cruise control master switch – low voltage	Wiring, cruise control master switch
P1598	AC refrigerant pressure sensor – high input	Wiring, AC refrigerant pressure too high (cooling fault/incorrectly charged), AC refrigerant pressure sensor
P1599	AC refrigerant pressure sensor – low input	Wiring, AC refrigerant pressure too low (incorrectly charged), AC refrigerant pressure sensor
P1602	Engine control module (ECM) not programmed	New ECM not programmed, incorrectly programmed, ECM
P1603	Engine control module (ECM) – RAM link error	ECM
P1604	Engine control module (ECM) – RAM read/write error	ECM
P1607	Engine control module (ECM) – shut down timer error	ECM
P1681	CAN data bus, instrumentation – no signal	Wiring, instrumentation control module
P1682	Alternator – voltage low	Wiring, battery, alternator drive belt, alternator
P1683	Cruise control	Wiring, cruise control vacuum switching valve
P1684	Engine control module (ECM) – supply voltage disconnected within last 50 ignition switch ON-OFF cycles	Wiring, battery
P1685	Key not programmed into immobilizer control module	Wiring, ignition key not matched/damaged, immobilizer control module
P1686	CAN data bus, immobilizer control module – no signal	Wiring, immobilizer control module
P1687	CAN data bus, instrumentation – no signal	Wiring, instrumentation control module (mechanical)
P1695	CAN data bus, body control module (BCM) – no signal	Wiring, BCM
P1696	Engine control module (ECM) – EEPROM error	ECM
P1697	Engine control module (ECM) – EEPROM error	ECM



**CHRYSLER**

Model: Neon 2,0 • Stratus 2,0 • Stratus 2,5

**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1698	CAN data bus, transmission control module (TCM) – no signal	Wiring, TCM
P1765	Transmission system relay	Wiring open circuit/short circuit, transmission system relay, ECM/TCM
P1899	Park/neutral position (PNP) switch – input circuit malfunction	Wiring, PNP switch, ECM/TCM
P2008	Intake manifold air control solenoid (short intake manifold runner)	Wiring open circuit/short circuit, intake manifold air control solenoid (short intake manifold runner)
P2302	Ignition coil 1, secondary – circuit malfunction	Wiring, ignition coil
P2305	Ignition coil 2, secondary – circuit malfunction	Wiring, ignition coil
P2308	Ignition coil 3, secondary – circuit malfunction	Wiring, ignition coil
P2311	Ignition coil 4, secondary – circuit malfunction	Wiring, ignition coil
P2314	Ignition coil 5, secondary – circuit malfunction	Wiring, ignition coil
P2317	Ignition coil 6, secondary – circuit malfunction	Wiring, ignition coil
P2503	Charging system – voltage low	Wiring, poor connection, battery, alternator



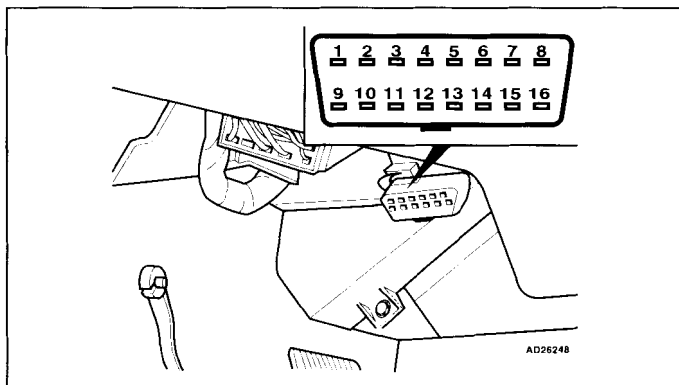
Model: Voyager 2,4/3,3/3,8 • Grand Voyager 2,4/3,3/3,8  
Year: 1996-97  
Engine code: EDZ, EGA, EGM, EGH  
System: SBEC III

**CHRYSLER**



Engine management

## Data link connector (DLC) locations



## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes can be displayed by the MIL or by using diagnostic equipment connected to the data link connector (DLC).

### Accessing – flash type

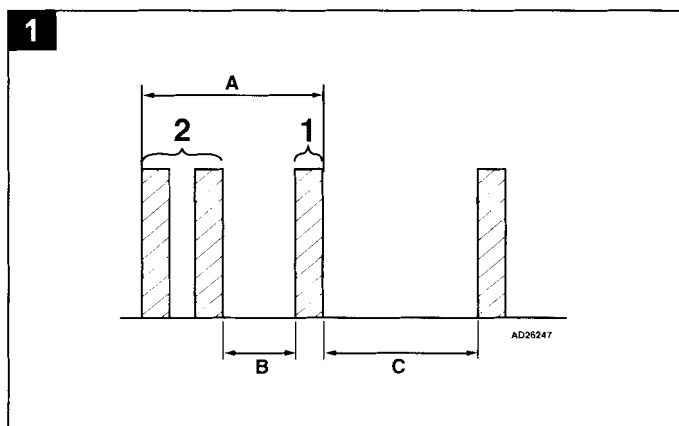
- Within 5 seconds switch ignition ON-OFF-ON-OFF-ON.
- Count MIL flashes. Note trouble codes.
- Each trouble code consists of two groups **1** [A].
- The first group of flashes indicate the 'tens' of the trouble code.
- The second group of flashes indicate the 'units' of the trouble code.
- A short pause separates 'tens' and 'units' **1** [B].
- A long pause separates each trouble code **1** [C].
- For example: Trouble code 21 displayed **1**.
- End of test sequence indicated by trouble code 55.

### Accessing – EOBD/Hex type

- Trouble codes can only be displayed by using diagnostic equipment connected to the data link connector (DLC).

### Erasing

- The engine control module (ECM) fault memory can only be erased using diagnostic equipment connected to the data link connector (DLC).





## Engine management

### Trouble code identification – EOBD type

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1290	Compressed natural gas pressure sensor – pressure high	Compressed natural gas system, wiring, compressed natural gas pressure sensor
P1294	Idle speed control (ISC) system – rpm lower/higher than expected	Wiring, air leak, throttle valve tight/sticking, IAC valve
P1297	Manifold absolute pressure (MAP) sensor	Wiring, hose connection(s), MAP sensor
P1391	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – intermittent signal	Wiring, poor connection, air gap, CKP sensor, CMP sensor
P1398	Engine control module (ECM) – misfire detection limit reached	Wiring, poor connection, CKP sensor
P1486	Evaporative emission (EVAP) system – blockage detected	Hose connection(s), hose blocked/trapped, EVAP canister
P1491	Engine coolant blower motor relay – low/high speed	Wiring open circuit/short circuit, engine coolant blower motor relay – low/high speed
P1492	Battery ambient temperature sensor – voltage high	Wiring, battery ambient temperature sensor
P1493	Battery ambient temperature sensor – voltage low	Wiring, battery ambient temperature sensor
P1494	Evaporative emission (EVAP) leak detection pump – pressure switch	Wiring, hose leak/blockage, EVAP leak detection pump
P1495	Evaporative emission (EVAP) leak detection pump solenoid	Wiring open circuit/short circuit, hose leak/blockage, EVAP leak detection pump solenoid
P1496	Engine control module (ECM) – 5 volt output low	ECM
P1696	Engine control module (ECM) – EEPROM error	ECM
P1697	Engine control module (ECM) – EEPROM error	ECM
P1698	CAN data bus, transmission control module (TCM) – no signal	Wiring, TCM
P1899	Park/neutral position (PNP) switch – input circuit malfunction	Wiring, PNP switch, ECM/TCM

### Trouble code identification – flash/Hex type

Flash type	Hex type	Fault location	Probable cause
11		Crankshaft position (CKP) sensor/camshaft position (CMP) sensor	Wiring, poor connection, air gap, CKP sensor, CMP sensor
	9D	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – intermittent signal	Wiring, poor connection, air gap, CKP sensor, CMP sensor
	28	Crankshaft position (CKP) sensor – no signal	Wiring, air gap, CKP sensor
	BA	Engine control module (ECM) – misfire detection limit reached	Wiring, poor connection, CKP sensor
12		Engine control module (ECM) – supply voltage disconnected within last 50 ignition switch ON-OFF cycles	Wiring, battery
13	27	Manifold absolute pressure (MAP) sensor	Wiring, hose connection(s), MAP sensor
14		Manifold absolute pressure (MAP) sensor – input low/high	Wiring, MAP sensor
	24	Manifold absolute pressure (MAP) sensor – low input	Wiring short circuit to earth, MAP sensor
	25	Manifold absolute pressure (MAP) sensor – high input	Wiring short circuit to positive, MAP sensor





Flash type	Hex type	Fault location	Probable cause
15	23	Vehicle speed sensor (VSS) – signal	Wiring, VSS
17		Engine temperature low for long period	Wiring, engine cooling system, coolant thermostat, ECT sensor
	21	Engine temperature low for long period	Wiring, engine cooling system, coolant thermostat, ECT sensor
	80	Insufficient coolant temperature for closed loop fuel control	Wiring, engine cooling system, coolant thermostat, ECT sensor
21		Heated oxygen sensor (HO2S) 1/2, bank 1 – circuit malfunction/incorrect signal/voltage low/high	Wiring, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, HO2S
	9B	Heated oxygen sensor (HO2S) 1, bank 1 – low voltage	Exhaust leak, wiring short circuit to earth, HO2S
	3E	Heated oxygen sensor (HO2S) 1, bank 1 – high voltage	Wiring short circuit to positive, fuel pressure, injector control, EVAP canister purge valve, air filter blocked, HO2S
	66	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Wiring, heating inoperative, HO2S
	20	Heated oxygen sensor (HO2S) 1, bank 1 – no activity detected	Wiring open circuit, heating inoperative, HO2S
	67	Heated oxygen sensor (HO2S) 1, bank 1 – heater control – circuit malfunction	Wiring, HO2S
	9C	Heated oxygen sensor (HO2S) 2, bank 1 – low voltage	Exhaust leak, wiring short circuit to earth, HO2S
	7E	Heated oxygen sensor (HO2S) 2, bank 1 – high voltage	Wiring short circuit to positive, catalytic converter, HO2S
	81	Heated oxygen sensor (HO2S) 2, bank 1 – no activity detected	Wiring, heating inoperative, HO2S
	69	Heated oxygen sensor (HO2S) 2, bank 1, heater control – circuit malfunction	Wiring, HO2S
	C0	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Wiring, heating inoperative, HO2S
22		Engine coolant temperature (ECT) sensor – voltage low/high	Wiring, coolant thermostat, ECT sensor
	1E	Engine coolant temperature (ECT) sensor – low input	Coolant thermostat, wiring short circuit to earth, ECT sensor
	1F	Engine coolant temperature (ECT) sensor – high input	Coolant thermostat, wiring open circuit/short to positive, earth wire defective, ECT sensor
23		Intake air temperature (IAT) sensor – voltage low/high	Wiring, IAT sensor
	39	Intake air temperature (IAT) sensor – low input	Wiring short circuit to earth, IAT sensor
	3A	Intake air temperature (IAT) sensor – high input	Wiring open circuit/short to positive, earth wire defective, IAT sensor
24		Throttle position (TP) sensor – voltage low/high	Wiring, accelerator cable adjustment, TP sensor
	84	Throttle position (TP) sensor – range/performance problem	Wiring, accelerator cable adjustment, TP sensor
	1A	Throttle position (TP) sensor – low input	Wiring short circuit to earth, TP sensor
	1B	Throttle position (TP) sensor – high input	Wiring short circuit to positive, TP sensor





## Engine management

Flash type	Hex type	Fault location	Probable cause
25		Idle air control (IAC) valve	Wiring open circuit/short circuit, IAC valve
	19	Idle speed control (ISC) system – malfunction	Wiring open circuit/short circuit, IAC valve
	8A	Idle speed control (ISC) system – rpm lower/higher than expected	Wiring, air leak, throttle valve tight/sticking, IAC valve
27		Injector(s) – circuit malfunction	Wiring, injector
	15	Injector 1 – circuit malfunction	Wiring, injector
	14	Injector 2 – circuit malfunction	Wiring, injector
	13	Injector 3 – circuit malfunction	Wiring, injector
	3D	Injector 4 – circuit malfunction	Wiring, injector
	45	Injector 5 – circuit malfunction	Wiring, injector
	46	Injector 6 – circuit malfunction	Wiring, injector
31		Evaporative emission (EVAP) canister purge valve – open/short circuit	Wiring, EVAP canister purge valve
	71	Evaporative emission (EVAP) system – incorrect flow detected	Hose connection(s), intake leak, EVAP canister purge valve
	A0	Evaporative emission (EVAP) system – small leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
	12	Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring open circuit/short circuit, EVAP canister purge valve
	A1	Evaporative emission (EVAP) system – large leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
	BB	Evaporative emission (EVAP) system – blockage detected	Hose connection(s), hose blocked/trapped, EVAP canister
	B8	Evaporative emission (EVAP) leak detection pump – pressure switch	Wiring, hose leak/blockage, EVAP leak detection pump
	B7	Evaporative emission (EVAP) leak detection pump solenoid	Wiring open circuit/short circuit, hose leak/blockage, EVAP leak detection pump solenoid
32		Exhaust gas recirculation (EGR) solenoid/ EGR system – circuit malfunction	Wiring, hoses, EGR solenoid
	2E	Exhaust gas recirculation (EGR) system – insufficient flow detected	Hose leak/blockage, wiring, EGR valve, EGR solenoid
	11	Exhaust gas recirculation (EGR) – circuit malfunction	Wiring open circuit/short circuit, EGR solenoid
33		AC compressor clutch relay/ AC refrigerant pressure sensor – voltage low/high	AC refrigerant pressure too low/high (cooling fault/ incorrectly charged), wiring open circuit/short circuit, AC compressor clutch relay, AC refrigerant pressure sensor
	10	AC compressor clutch relay	Wiring open circuit/short circuit, AC compressor clutch relay
	5A	AC refrigerant pressure sensor – high input	AC refrigerant pressure too high (cooling fault/ incorrectly charged), wiring, AC refrigerant pressure sensor
	5B	AC refrigerant pressure sensor – low input	AC refrigerant pressure too low (incorrectly charged), wiring, AC refrigerant pressure sensor
34	0F	Cruise control	Wiring open circuit/short circuit, hoses, voltage low/high, cruise control master switch, cruise control vacuum switching valve
35	0E	Engine coolant blower motor relay – low/high speed	Wiring open circuit/short circuit, engine coolant blower motor relay – low/high speed



Flash type	Hex type	Fault location	Probable cause
37		Torque converter clutch (TCC) solenoid/ park/neutral position (PNP) switch – circuit malfunction	Wiring, TCC solenoid
	72	Park/neutral position (PNP) switch – input circuit malfunction	Wiring, PNP switch, ECM/TCM
	94	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid
	0C	Torque converter clutch (TCC) solenoid – electrical	Wiring open circuit/short circuit, TCC solenoid
41	0B	Alternator, field control – circuit malfunction	Wiring open circuit/short circuit, alternator, battery
42		Fuel pump relay/engine control relay/fuel level sensor – circuit malfunction	Wiring open circuit/short circuit, fuel pump relay, engine control relay, fuel level sensor
	65	Fuel pump relay	Wiring open circuit/short circuit, fuel pump relay
	0A	Engine control relay	Wiring open circuit/short circuit, engine control relay
	2C	Engine control relay	Wiring open circuit, engine control relay
	95	Fuel level sensor – low input	Wiring open circuit, fuel level sensor
	96	Fuel level sensor – high input	Wiring short circuit to positive, fuel level sensor
	97	Fuel level sensor – malfunction	Wiring, fuel level sensor
43		Random/multiple cylinder(s) – misfire detected	Wiring, spark plug(s), HT lead(s), injector(s), ignition coil(s), low compression
	6A	Random/multiple cylinder(s) – misfire detected	Wiring, spark plug(s), HT lead(s), injector(s), ignition coil(s), low compression
	6B	Cylinder 1 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
	6C	Cylinder 2 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
	6D	Cylinder 3 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
	6E	Cylinder 4 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
	AE	Cylinder 5 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
	AF	Cylinder 6 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
	2B	Ignition coil A, primary/secondary – circuit malfunction	Wiring, ignition coil
	2A	Ignition coil B, primary/secondary – circuit malfunction	Wiring, ignition coil
	29	Ignition coil C, primary/secondary – circuit malfunction	Wiring, ignition coil
44		Battery temperature sensor – voltage low/high	Wiring, battery temperature sensor
	9A	Battery ambient temperature sensor – voltage high	Wiring, battery ambient temperature sensor
	99	Battery ambient temperature sensor – voltage low	Wiring, battery ambient temperature sensor
45	89	Transmission control system – malfunction	Wiring, ECM/TCM





## Engine management

Flash type	Hex type	Fault location	Probable cause
46	06	Alternator – voltage high	Wiring, battery, alternator
47	05	Alternator – voltage low	Wiring, battery, alternator drive belt, alternator
51	77	System too lean	Wiring, intake/exhaust leak, MAP sensor, fuel pressure/pump, EVAP canister purge valve, injector(s), heated oxygen sensor (HO2S)
52	76	System too rich	Wiring, intake blocked, EVAP canister purge valve, fuel pressure, EGR system, injector(s), air filter blocked, ignition system, heated oxygen sensor (HO2S)
53		Engine control module (ECM) – internal fault	ECM
	02	Engine control module (ECM) – internal fault	ECM
	44	Engine control module (ECM) – internal fault	ECM
54	01	Camshaft position (CMP) sensor – no signal	Wiring, CMP sensor
55		End of MIL code output	–
61	3C	Manifold absolute pressure (MAP) sensor – barometric pressure range/performance problem	Intake/exhaust leak, wiring, MAP sensor
62	30	Engine control module (ECM) – EEPROM error	ECM
63	31	Engine control module (ECM) – EEPROM error	ECM
64	BE	Compressed natural gas pressure sensor – pressure high	Compressed natural gas system, wiring, compressed natural gas pressure sensor
65	98	Brake pedal position (BPP) switch – circuit malfunction	Wiring, BPP switch
66		CAN data bus, transmission control module (TCM)/body control module (BCM) – no signal	Wiring, TCM, BCM
	60	CAN data bus, transmission control module (TCM) – no signal	Wiring, TCM
	61	CAN data bus, body control module (BCM) – no signal	Wiring, BCM
71	92	Engine control module (ECM) – 5 volt output low	ECM
72	70	Catalytic converter system, bank 1 – efficiency below threshold	Catalytic converter, wiring, heated oxygen sensor (HO2S) 2
77	52	Cruise control	Wiring, cruise control vacuum switching valve



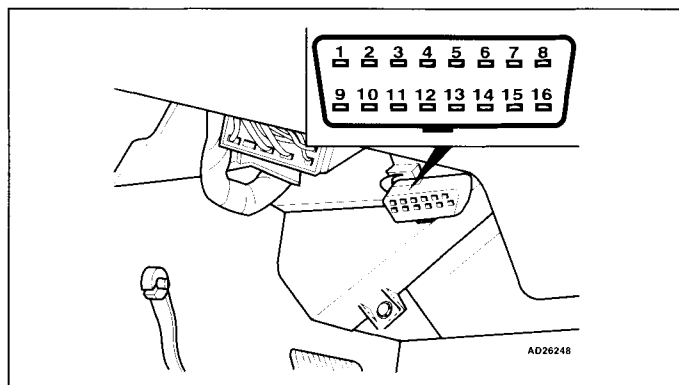
Model: Voyager 2,4/3,3/3,8 • Grand Voyager 2,4/3,3/3,8  
 Year: 1998  
 Engine code: EDZ, EGA, EGM, EGH  
 System: SBEC III

**CHRYSLER**



Engine management

## Data link connector (DLC) locations



## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification – EOBD type

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1290	Compressed natural gas pressure sensor – pressure high	Compressed natural gas system, wiring, compressed natural gas pressure sensor
P1294	Idle speed control (ISC) system – rpm lower/higher than expected	Wiring, air leak, throttle valve tight/sticking, IAC valve
P1391	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – intermittent signal	Wiring, poor connection, air gap, CKP sensor, CMP sensor
P1398	Engine control module (ECM) – misfire detection limit reached	Wiring, poor connection, CKP sensor
P1486	Evaporative emission (EVAP) system – blockage detected	Hose connection(s), hose blocked/trapped, EVAP canister
P1491	Engine coolant blower motor relay – low/high speed	Wiring open circuit/short circuit, engine coolant blower motor relay – low/high speed
P1492	Battery ambient temperature sensor – voltage high	Wiring, battery ambient temperature sensor
P1493	Battery ambient temperature sensor – voltage low	Wiring, battery ambient temperature sensor



**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
<b>P1494</b>	Evaporative emission (EVAP) leak detection pump – pressure switch	Wiring, hose leak/blockage, EVAP leak detection pump
<b>P1495</b>	Evaporative emission (EVAP) leak detection pump solenoid	Wiring open circuit/short circuit, hose leak/blockage, EVAP leak detection pump solenoid
<b>P1496</b>	Engine control module (ECM) – 5 volt output low	ECM
<b>P1595</b>	Cruise control	Wiring open circuit/short circuit, hoses, cruise control master switch, cruise control vacuum switching valve
<b>P1696</b>	Engine control module (ECM) – EEPROM error	ECM
<b>P1698</b>	CAN data bus, transmission control module (TCM) – no signal	Wiring, TCM
<b>P1899</b>	Park/neutral position (PNP) switch – input circuit malfunction	Wiring, PNP switch, ECM/TCM

**Trouble code identification – Hex type**

<b>Hex type</b>	<b>Fault location</b>	<b>Probable cause</b>
<b>01</b>	Camshaft position (CMP) sensor – no signal	Wiring, CMP sensor
<b>02</b>	Engine control module (ECM) – internal fault	ECM
<b>05</b>	Alternator – voltage low	Wiring, battery, alternator drive belt, alternator
<b>06</b>	Alternator – voltage high	Wiring, battery, alternator
<b>0A</b>	Engine control relay	Wiring open circuit/short circuit, engine control relay
<b>0B</b>	Alternator, field control – circuit malfunction	Wiring open circuit/short circuit, alternator, battery
<b>0C</b>	Torque converter clutch (TCC) solenoid – electrical	Wiring open circuit/short circuit, TCC solenoid
<b>0E</b>	Engine coolant blower motor relay – low/high speed	Wiring open circuit/short circuit, engine coolant blower motor relay – low/high speed
<b>0F</b>	Cruise control	Wiring open circuit/short circuit, hoses, cruise control master switch, cruise control vacuum switching valve
<b>10</b>	AC compressor clutch relay	Wiring open circuit/short circuit, AC compressor clutch relay
<b>11</b>	Exhaust gas recirculation (EGR) – circuit malfunction	Wiring open circuit/short circuit, EGR solenoid
<b>12</b>	Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring open circuit/short circuit, EVAP canister purge valve
<b>13</b>	Injector 3 – circuit malfunction	Wiring, injector
<b>14</b>	Injector 2 – circuit malfunction	Wiring, injector
<b>15</b>	Injector 1 – circuit malfunction	Wiring, injector
<b>19</b>	Idle speed control (ISC) system – malfunction	Wiring open circuit/short circuit, IAC valve
<b>1A</b>	Throttle position (TP) sensor – low input	Wiring short circuit to earth, TP sensor
<b>1B</b>	Throttle position (TP) sensor – high input	Wiring short circuit to positive, TP sensor
<b>1E</b>	Engine coolant temperature (ECT) sensor – low input	Coolant thermostat, wiring short circuit to earth, ECT sensor
<b>1F</b>	Engine coolant temperature (ECT) sensor – high input	Coolant thermostat, wiring open circuit/short to positive, earth wire defective, ECT sensor



Hex type	Fault location	Probable cause
20	Heated oxygen sensor (HO2S) 1, bank 1 – no activity detected	Wiring open circuit, heating inoperative, HO2S
21	Engine temperature low for long period	Wiring, engine cooling system, coolant thermostat, ECT sensor
23	Vehicle speed sensor (VSS) – signal	Wiring, VSS
24	Manifold absolute pressure (MAP) sensor – low input	Wiring short circuit to earth, MAP sensor
25	Manifold absolute pressure (MAP) sensor – high input	Wiring short circuit to positive, MAP sensor
27	Manifold absolute pressure (MAP) sensor	Wiring, hose connection(s), MAP sensor
28	Crankshaft position (CKP) sensor – no signal	Wiring, air gap, CKP sensor
29	Ignition coil C, primary/secondary – circuit malfunction	Wiring, ignition coil
2A	Ignition coil B, primary/secondary – circuit malfunction	Wiring, ignition coil
2B	Ignition coil A, primary/secondary – circuit malfunction	Wiring, ignition coil
2C	Engine control relay	Wiring open circuit, engine control relay
2E	Exhaust gas recirculation (EGR) system – insufficient flow detected	Hose leak/blockage, wiring, EGR valve, EGR solenoid
30	Engine control module (ECM) – EEPROM error	ECM
31	Engine control module (ECM) – EEPROM error	ECM
39	Intake air temperature (IAT) sensor – low input	Wiring short circuit to earth, IAT sensor
3A	Intake air temperature (IAT) sensor – high input	Wiring open circuit/short to positive, earth wire defective, IAT sensor
3C	Manifold absolute pressure (MAP) sensor – barometric pressure range/performance problem	Intake/exhaust leak, wiring, MAP sensor
3D	Injector 4 – circuit malfunction	Wiring, injector
3E	Heated oxygen sensor (HO2S) 1, bank 1 – high voltage	Wiring short circuit to positive, fuel pressure, injector control, EVAP canister purge valve, air filter blocked, HO2S
44	Engine control module (ECM) – internal fault	ECM
45	Injector 5 – circuit malfunction	Wiring, injector
46	Injector 6 – circuit malfunction	Wiring, injector
52	Cruise control	Wiring, cruise control vacuum switching valve
5A	AC refrigerant pressure sensor – high input	AC refrigerant pressure too high (cooling fault/incorrectly charged), wiring, AC refrigerant pressure sensor
5B	AC refrigerant pressure sensor – low input	AC refrigerant pressure too low (incorrectly charged), wiring, AC refrigerant pressure sensor
60	CAN data bus, transmission control module (TCM) – no signal	Wiring, TCM
61	CAN data bus, body control module (BCM) – no signal	Wiring, BCM
65	Fuel pump relay	Wiring open circuit/short circuit, fuel pump relay
66	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Wiring, heating inoperative, HO2S
67	Heated oxygen sensor (HO2S) 1, bank 1 – heater control – circuit malfunction	Wiring, HO2S
69	Heated oxygen sensor (HO2S) 2, bank 1, heater control – circuit malfunction	Wiring, HO2S



**Engine management**

Hex type	Fault location	Probable cause
6A	Random/multiple cylinder(s) – misfire detected	Wiring, spark plug(s), HT lead(s), injector(s), ignition coil(s), low compression
6B	Cylinder 1 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
6C	Cylinder 2 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
6D	Cylinder 3 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
6E	Cylinder 4 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
70	Catalytic converter system, bank 1 – efficiency below threshold	Catalytic converter, wiring, heated oxygen sensor (HO2S) 2
71	Evaporative emission (EVAP) system – incorrect flow detected	Hose connection(s), intake leak, EVAP canister purge valve
72	Park/neutral position (PNP) switch – input circuit malfunction	Wiring, PNP switch, ECM/TCM
76	System too rich	Wiring, intake blocked, EVAP canister purge valve, fuel pressure, EGR system, injector(s), air filter blocked, ignition system, heated oxygen sensor (HO2S)
77	System too lean	Wiring, intake/exhaust leak, MAP sensor, fuel pressure/pump, EVAP canister purge valve, injector(s), heated oxygen sensor (HO2S)
7E	Heated oxygen sensor (HO2S) 2, bank 1 – high voltage	Wiring short circuit to positive, catalytic converter, HO2S
80	Insufficient coolant temperature for closed loop fuel control	Wiring, engine cooling system, coolant thermostat, ECT sensor
81	Heated oxygen sensor (HO2S) 2, bank 1 – no activity detected	Wiring, heating inoperative, HO2S
84	Throttle position (TP) sensor – range/performance problem	Wiring, accelerator cable adjustment, TP sensor
89	Transmission control system – malfunction	Wiring, ECM/TCM
8A	Idle speed control (ISC) system – rpm lower/higher than expected	Wiring, air leak, throttle valve tight/sticking, IAC valve
92	Engine control module (ECM) – 5 volt output low	ECM
94	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid
95	Fuel level sensor – low input	Wiring open circuit, fuel level sensor
96	Fuel level sensor – high input	Wiring short circuit to positive, fuel level sensor
97	Fuel level sensor – malfunction	Wiring, fuel level sensor
98	Brake pedal position (BPP) switch – circuit malfunction	Wiring, BPP switch
99	Battery ambient temperature sensor – voltage low	Wiring, battery ambient temperature sensor
9A	Battery ambient temperature sensor – voltage high	Wiring, battery ambient temperature sensor
9B	Heated oxygen sensor (HO2S) 1, bank 1 – low voltage	Exhaust leak, wiring short circuit to earth, HO2S
9C	Heated oxygen sensor (HO2S) 2, bank 1 – low voltage	Exhaust leak, wiring short circuit to earth, HO2S
9D	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – intermittent signal	Wiring, poor connection, air gap, CKP sensor, CMP sensor





Hex type	Fault location	Probable cause
A0	Evaporative emission (EVAP) system – small leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
A1	Evaporative emission (EVAP) system – large leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
AE	Cylinder 5 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
AF	Cylinder 6 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
B7	Evaporative emission (EVAP) leak detection pump solenoid	Wiring open circuit/short circuit, hose leak/blockage, EVAP leak detection pump solenoid
B8	Evaporative emission (EVAP) leak detection pump – pressure switch	Wiring, hose leak/blockage, EVAP leak detection pump
BA	Engine control module (ECM) – misfire detection limit reached	Wiring, poor connection, CKP sensor
BB	Evaporative emission (EVAP) system – blockage detected	Hose connection(s), hose blocked/trapped, EVAP canister
BE	Compressed natural gas pressure sensor – pressure high	Compressed natural gas system, wiring, compressed natural gas pressure sensor
C0	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Wiring, heating inoperative, HO2S



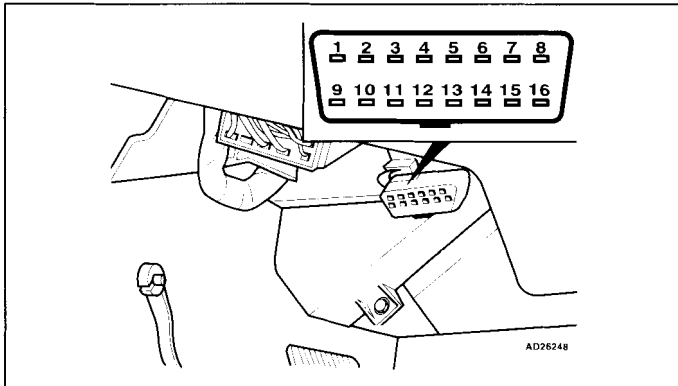


# CHRYSLER

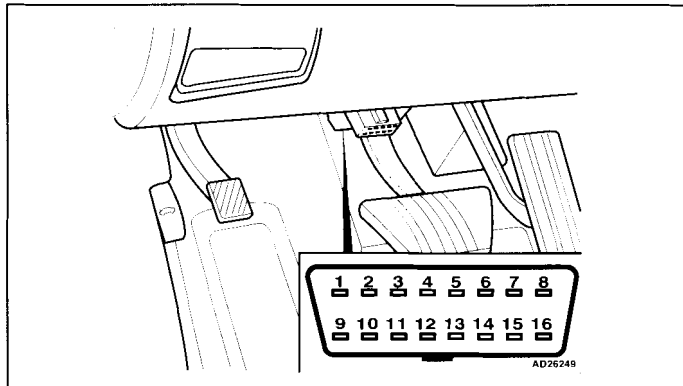
Model: Voyager 2,4/3,3/3,8 • Grand Voyager 2,4/3,3/3,8  
Year: 1999-02  
Engine code: EDZ, EGA, EGM, EGH  
System: SBEC III

## Engine management

### Data link connector (DLC) locations



→2000



2000→

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing – →2001

- The engine control module (ECM) fault memory can only be accessed using diagnostic equipment connected to the data link connector (DLC).

#### Accessing – 2001→

- Within 5 seconds switch ignition ON-OFF-ON-OFF-ON.
- Odometer will display trouble codes.
- If no trouble codes are stored in ECM, odometer will display 'P1684' and 'done' or only 'done'.
- The engine control module (ECM) fault memory can also be accessed using diagnostic equipment connected to the data link connector (DLC).

#### Erasing

- The engine control module (ECM) fault memory can only be erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1192	Intake air temperature (IAT) sensor – voltage low	Wiring, IAT sensor
P1193	Intake air temperature (IAT) sensor – voltage high	Wiring, IAT sensor
P1195	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Heating inoperative, wiring, HO2S
P1196	Heated oxygen sensor (HO2S) 2, bank 1 – slow response	Heating inoperative, wiring, HO2S
P1281	Engine temperature low for long period	Wiring, engine cooling system, coolant thermostat, ECT sensor
P1282	Fuel pump relay	Wiring open circuit/short circuit, fuel pump relay
P1290	Compressed natural gas pressure sensor – pressure high	Compressed natural gas system, wiring, compressed natural gas pressure sensor



<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1292	Compressed natural gas pressure sensor – voltage high	Wiring, compressed natural gas pressure sensor
P1293	Compressed natural gas pressure sensor – voltage low	Wiring, compressed natural gas pressure sensor
P1294	Idle speed control (ISC) system – rpm lower/higher than expected	Wiring, air leak, throttle valve tight/sticking, IAC valve
P1295	Throttle position (TP) sensor – supply voltage	Wiring, TP sensor, ECM
P1296	Manifold absolute pressure (MAP) sensor – supply voltage	Wiring, MAP sensor, ECM
P1297	Manifold absolute pressure (MAP) sensor	Wiring, hose connection(s), MAP sensor
P1298	System too lean at prolonged wide open throttle	Intake/exhaust leak, MAP sensor, fuel pressure/pump, injector(s), HO2S
P1299	Manifold absolute pressure (MAP) sensor/throttle position (TP) sensor	Intake leak, hose connection(s), MAP sensor, TP sensor
P1388	Engine control relay	Wiring open circuit/short circuit, engine control relay
P1389	Engine control relay	Wiring open circuit, engine control relay
P1390	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – signal synchronisation	Timing belt loose/jumped position, CKP sensor, CMP sensor
P1391	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – intermittent signal	Wiring, poor connection, air gap, CKP sensor, CMP sensor
P1398	Engine control module (ECM) – misfire detection limit reached	Wiring, poor connection, CKP sensor
P1486	Evaporative emission (EVAP) system – blockage detected	Hose connection(s), hose blocked/trapped, EVAP canister
P1488	Engine control module (ECM) – auxiliary 5 volt output low	Wiring, ECM
P1489	Engine coolant blower motor relay	Wiring open circuit/short circuit, engine coolant blower motor relay – high speed
P1490	Engine coolant blower motor relay	Wiring open circuit/short circuit, engine coolant blower motor relay – low speed
P1491	Engine coolant blower motor relay – circuit malfunction	Wiring open circuit/short circuit, engine coolant blower motor relay
P1492	Battery ambient temperature sensor – high input	Wiring short circuit to positive, battery ambient temperature sensor, ECM
P1493	Battery ambient temperature sensor – voltage low	Wiring, battery ambient temperature sensor
P1494	Evaporative emission (EVAP) leak detection pump – pressure switch	Wiring, hose leak/blockage, EVAP leak detection pump
P1495	Evaporative emission (EVAP) leak detection pump solenoid	Wiring open circuit/short circuit, hose leak/blockage, EVAP leak detection pump solenoid
P1496	Engine control module (ECM) – 5 volt output low	ECM
P1594	Alternator – voltage high	Wiring, battery, alternator
P1595	Cruise control	Wiring open circuit/short circuit, hoses, cruise control master switch, cruise control vacuum switching valve
P1596	Cruise control master switch – high voltage	Wiring, cruise control master switch
P1597	Cruise control master switch – low voltage	Wiring, cruise control master switch
P1598	AC refrigerant pressure sensor – high input	Wiring, AC refrigerant pressure too high (cooling fault/incorrectly charged), AC refrigerant pressure sensor





## Engine management

EOBD type	Fault location	Probable cause
P1599	AC refrigerant pressure sensor – low input	Wiring, AC refrigerant pressure too low (incorrectly charged), AC refrigerant pressure sensor
P1602	Engine control module (ECM) not programmed	New ECM not programmed, incorrectly programmed, ECM
P1603	Engine control module (ECM) – RAM link error	ECM
P1604	Engine control module (ECM) – RAM read/write error	ECM
P1607	Engine control module (ECM) – shut down timer error	ECM
P1681	CAN data bus, instrumentation – no signal	Wiring, instrumentation control module
P1682	Alternator – voltage low	Wiring, battery, alternator drive belt, alternator
P1683	Cruise control	Wiring, cruise control vacuum switching valve
P1684	Engine control module (ECM) – supply voltage disconnected within last 50 ignition switch ON-OFF cycles	Wiring, battery
P1685	Key not programmed into immobilizer control module	Wiring, ignition key not matched/damaged, immobilizer control module
P1686	CAN data bus, immobilizer control module – no signal	Wiring, immobilizer control module
P1687	CAN data bus, instrumentation – no signal	Wiring, instrumentation control module (mechanical)
P1695	CAN data bus, body control module (BCM) – no signal	Wiring, BCM
P1696	Engine control module (ECM) – EEPROM error	ECM
P1697	Engine control module (ECM) – EEPROM error	ECM
P1698	CAN data bus, transmission control module (TCM) – no signal	Wiring, TCM
P1765	Transmission system relay	Wiring open circuit/short circuit, transmission system relay, ECM/TCM
P1899	Park/neutral position (PNP) switch – input circuit malfunction	Wiring, PNP switch, ECM/TCM
P2503	Charging system – voltage low	Wiring, poor connection, battery, alternator



Model: Cherokee 2,5/4,0 • Grand Cherokee 4,0/5,2  
Wrangler 2,5/4,0

Year: 1996-97

Engine code: VIN position 8 = P, S, Y

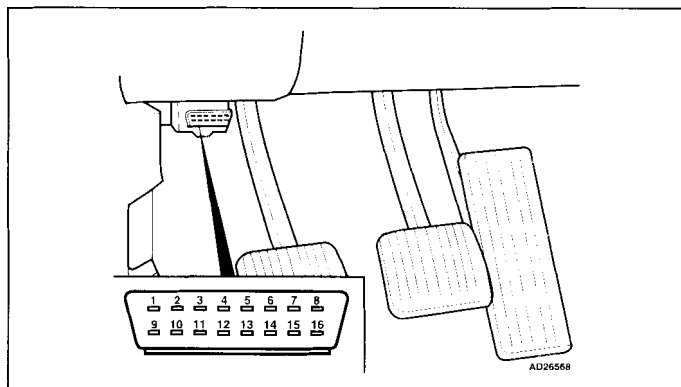
System: JTEC

**CHRYSLER**

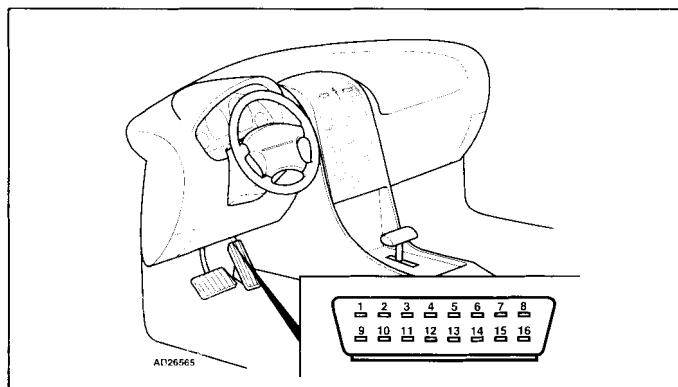


Engine management/transmission

## Data link connector (DLC) locations



Cherokee/Wrangler



Grand Cherokee

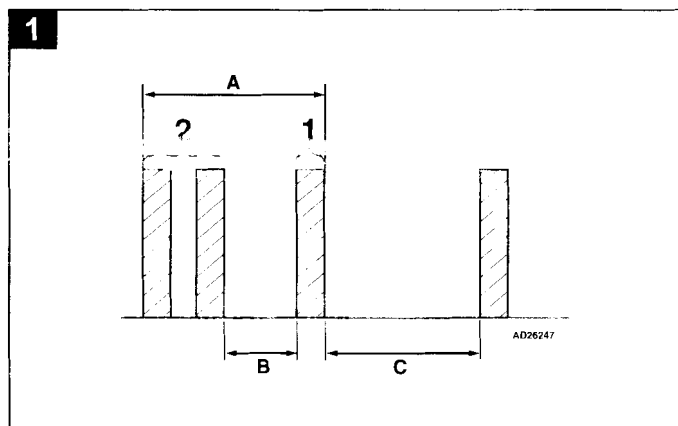
## Trouble codes

### General information

- Refer to the front of this manual for general test conditions terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Engine control module (ECM) incorporates transmission control module (TCM) function.
- Trouble codes can be displayed by the MIL, digital odometer or by using diagnostic equipment connected to the data link connector (DLC).

### Accessing – flash type

- Within 5 seconds switch ignition ON-OFF-ON-OFF-ON.
- Count MIL flashes. Note trouble codes.
- Each trouble code consists of two groups **1** [A].
- The first group of flashes indicate the 'tens' of the trouble code.
- The second group of flashes indicate the 'units' of the trouble code.
- A short pause separates 'tens' and 'units' **1** [B].
- A long pause separates each trouble code **1** [C].
- For example: Trouble code 21 displayed **1**.
- End of test sequence indicated by trouble code 55.
- Trouble codes can also be displayed by the digital odometer using the same key cycling procedure as above. After code 55 is displayed the odometer will return to its normal mode.



### Accessing – EOBD/Hex type

- Trouble codes can only be displayed by using diagnostic equipment connected to the data link connector (DLC).

### Erasing

- The engine control module (ECM) fault memory can only be erased using diagnostic equipment connected to the data link connector (DLC).

**CHRYSLER**

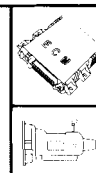
Model: Cherokee 2,5/4,0 • Grand Cherokee 4,0/5,2 • Wrangler 2,5/4,0



Engine management/transmission

**Trouble code identification – EOBD type**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P0	Refer to EOBD trouble code table	–
P1294	Idle speed control (ISC) system – rpm lower/higher than expected	Wiring, air leak, throttle valve tight/sticking, IAC valve
P1296	Manifold absolute pressure (MAP) sensor – supply voltage	Wiring, MAP sensor, ECM
P1297	Manifold absolute pressure (MAP) sensor	Wiring, hose connection(s), MAP sensor
P1391	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – intermittent signal	Wiring, poor connection, air gap, CKP sensor, CMP sensor
P1398	Engine control module (ECM) – misfire detection limit reached	Wiring, poor connection, engine mechanical fault, ignition/fuel system, CKP sensor, ECM
P1486	Evaporative emission (EVAP) system – blockage detected	Hose connection(s), hose blocked/trapped, EVAP canister
P1492	Battery ambient temperature sensor – voltage high	Wiring, battery ambient temperature sensor, ECM
P1493	Battery ambient temperature sensor – voltage low	Wiring, battery ambient temperature sensor, ECM
P1494	Evaporative emission (EVAP) leak detection pump – pressure switch	Wiring, hose leak/blockage, EVAP leak detection pump
P1495	Evaporative emission (EVAP) leak detection pump solenoid	Wiring open circuit/short circuit, hose leak/blockage, EVAP leak detection pump solenoid
P1698	Engine control module (ECM) – EEPROM error	ECM
P1756	Governor pressure not equal to target (15-20 PSI) – mid pressure malfunction	Signal wire open circuit/short circuit, valve body, sensor supply wire open circuit, transmission fluid level, governor pressure solenoid, transmission mechanical fault, ECM – no 5 volt supply
P1757	Governor pressure not equal to target – low pressure malfunction	Signal wire open circuit/short circuit, valve body, sensor supply wire open circuit, transmission fluid level, governor pressure solenoid, transmission mechanical fault, ECM – no 5 volt supply
P1762	Governor pressure sensor – incorrect signal	Signal wire short circuit to earth/positive, supply wire open circuit/short circuit, transmission fluid level, governor pressure solenoid, governor pressure sensor, ECM
P1763	Governor pressure sensor – signal high	Signal wire short circuit to positive, supply wire open circuit, transmission fluid level, governor pressure sensor, ECM
P1764	Governor pressure sensor – signal low	Signal wire short circuit to earth, supply wire open circuit, transmission fluid level, governor pressure sensor, ECM
P1765	Transmission system relay	Wiring open circuit/short circuit, transmission system relay, ECM
P1899	Park/neutral position (PNP) switch – input circuit malfunction	Wiring, PNP switch, ECM

**Trouble code identification – flash/Hex type**

Flash type	Hex type	Fault location	Probable cause
11		Crankshaft position (CKP) sensor/camshaft position (CMP) sensor	Wiring, poor connection, air gap, CKP sensor, CMP sensor
	28	Crankshaft position (CKP) sensor – no signal	Wiring, air gap, CKP sensor
	9D	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – intermittent signal	Wiring, poor connection, air gap, CKP sensor, CMP sensor
	BA	Engine control module (ECM) – misfire detection limit reached	Wiring, poor connection, engine mechanical fault, ignition/fuel system, CKP sensor, ECM
12		Engine control module (ECM) – supply voltage disconnected within last 50 ignition switch ON-OFF cycles	Wiring, battery
13	27	Manifold absolute pressure (MAP) sensor	Wiring, hose connection(s), MAP sensor
14		Manifold absolute pressure (MAP) sensor – input low/high	Wiring, MAP sensor
	24	Manifold absolute pressure (MAP) sensor – low input	Wiring short circuit to earth, MAP sensor
	25	Manifold absolute pressure (MAP) sensor – high input	Wiring short circuit to positive, MAP sensor
	87	Manifold absolute pressure (MAP) sensor – supply voltage	Wiring, MAP sensor, ECM
15		Vehicle speed sensor (VSS) – signal	Wiring, VSS, ECM
	23	Vehicle speed sensor (VSS) – no signal	Wiring, VSS, ECM
	A6	Vehicle speed sensor (VSS) – circuit malfunction	Wiring, VSS, ECM
17		Engine temperature low for long period	Wiring, engine cooling system, coolant thermostat, ECT sensor
	21	Engine temperature low for long period	Wiring, engine cooling system, coolant thermostat, ECT sensor
	80	Insufficient coolant temperature for closed loop fuel control	Wiring, engine cooling system, coolant thermostat, ECT sensor
21		Heated oxygen sensor (HO2S) 1/2, bank 1 – circuit/signal malfunction	Wiring, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, catalytic converter, HO2S
	3E	Heated oxygen sensor (HO2S) 1, bank 1 – high voltage	Wiring short circuit to positive, HO2S
	66	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Heating inoperative, wiring, HO2S
	67	Heated oxygen sensor (HO2S) 1, bank 1 – heater control – circuit malfunction	Wiring, HO2S
	69	Heated oxygen sensor (HO2S) 2, bank 1, heater control – circuit malfunction	Wiring, HO2S
	7E	Heated oxygen sensor (HO2S) 2, bank 1 – high voltage	Wiring short circuit to positive, catalytic converter, HO2S
	9B	Heated oxygen sensor (HO2S) 1, bank 1 – low voltage	Exhaust leak, wiring short circuit to earth, HO2S
	9C	Heated oxygen sensor (HO2S) 2, bank 1 – low voltage	Exhaust leak, wiring short circuit to earth, HO2S
	CO	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Heating inoperative, wiring, HO2S





# CHRYSLER

Model: Cherokee 2,5/4,0 • Grand Cherokee 4,0/5,2 • Wrangler 2,5/4,0

Engine management/transmission

Flash type	Hex type	Fault location	Probable cause
22		Engine coolant temperature (ECT) sensor – voltage low/high	Wiring, coolant thermostat, ECT sensor
	1E	Engine coolant temperature (ECT) sensor – low input	Coolant thermostat, wiring short circuit to earth, ECT sensor
	1F	Engine coolant temperature (ECT) sensor – high input	Coolant thermostat, wiring open circuit/short to positive, earth wire defective, ECT sensor
23		Intake air temperature (IAT) sensor – voltage low/high	Wiring, IAT sensor
	39	Intake air temperature (IAT) sensor – low input	Wiring short circuit to earth, IAT sensor
	3A	Intake air temperature (IAT) sensor – high input	Wiring open circuit/short to positive, earth wire defective, IAT sensor
24		Throttle position (TP) sensor – voltage low/high	Wiring, accelerator cable adjustment, TP sensor
	1A	Throttle position (TP) sensor – low input	Wiring short circuit to earth, TP sensor
	1B	Throttle position (TP) sensor – high input	Wiring short circuit to positive, TP sensor
	84	Throttle position (TP) sensor – range/performance problem	Wiring, accelerator cable adjustment, TP sensor
25		Idle air control (IAC) valve	Wiring open circuit/short circuit, IAC valve
	19	Idle speed control (ISC) system – malfunction	Wiring open circuit/short circuit, IAC valve
	8A	Idle speed control (ISC) system – rpm lower/higher than expected	Wiring, air leak, throttle valve tight/sticking, IAC valve
27		Injector(s) – circuit malfunction	Wiring, injector
	13	Injector 3 – circuit malfunction	Wiring, injector
	14	Injector 2 – circuit malfunction	Wiring, injector
	15	Injector 1 – circuit malfunction	Wiring, injector
	3D	Injector 4 – circuit malfunction	Wiring, injector
	45	Injector 5 – circuit malfunction	Wiring, injector
	46	Injector 6 – circuit malfunction	Wiring, injector
	4F	Injector 7 – circuit malfunction	Wiring, injector
	50	Injector 8 – circuit malfunction	Wiring, injector
31		Evaporative emission (EVAP) canister purge valve/EVAP system	Wiring, EVAP canister, EVAP canister purge valve
	12	Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring open circuit/short circuit, EVAP canister purge valve
	71	Evaporative emission (EVAP) system – incorrect flow detected	Hose connection(s), intake leak, EVAP canister purge valve
	A0	Evaporative emission (EVAP) system – small leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
	A1	Evaporative emission (EVAP) system – large leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
	BB	Evaporative emission (EVAP) system – blockage detected	Hose connection(s), hose blocked/trapped, EVAP canister
	B8	Evaporative emission (EVAP) leak detection pump – pressure switch	Wiring, hose leak/blockage, EVAP leak detection pump
	B7	Evaporative emission (EVAP) leak detection pump solenoid	Wiring open circuit/short circuit, hose leak/blockage, EVAP leak detection pump solenoid





Flash type	Hex type	Fault location	Probable cause
33	10	AC compressor clutch relay	Wiring open circuit/short circuit, AC compressor clutch relay
34		Cruise control	Wiring open circuit/short circuit, hoses, voltage low/high, cruise control master switch, cruise control vacuum switching valve
	0F	Cruise control	Wiring open circuit/short circuit, hoses, voltage low/high, cruise control vacuum switching valve
	56	Cruise control master switch – high voltage	Wiring, cruise control master switch
	57	Cruise control master switch – low voltage	Wiring, cruise control master switch
35	0E	Engine coolant blower motor relay	Wiring open circuit/short circuit, engine coolant blower motor relay – low/high speed
37		Transmission control system – malfunction	Wiring, transmission fluid level, transmission mechanical fault, PNP switch, TCC solenoid, TFT sensor, TFP solenoid, shift solenoid, governor pressure solenoid, transmission system relay, ECM
	0C	Torque converter clutch (TCC) solenoid – electrical	Wiring open circuit/short circuit, TCC solenoid
	32	Shift solenoid (SS) 3-4 – electrical	Wiring, shift solenoid, ECM
	72	Park/neutral position (PNP) switch – input circuit malfunction	Wiring, PNP switch, ECM
	8D	Governor pressure not equal to target (15-20 PSI) – mid pressure malfunction	Signal wire open circuit/short circuit, valve body, sensor supply wire open circuit, transmission fluid level, governor pressure solenoid, transmission mechanical fault, ECM – no 5 volt supply
	8E	Governor pressure not equal to target – low pressure malfunction	Signal wire open circuit/short circuit, valve body, sensor supply wire open circuit, transmission fluid level, governor pressure solenoid, transmission mechanical fault, ECM – no 5 volt supply
	94	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid
	A4	Transmission fluid temperature (TFT) sensor – range/performance problem	Wiring, TFT sensor
	A5	Gear selection, 3-4 – shift malfunction	Wiring, TR sensor, shift solenoids, transmission mechanical fault
	AB	Transmission fluid pressure (TFP) solenoid – electrical	Wiring, TFP solenoid, ECM
	AD	Transmission system relay	Wiring open circuit/short circuit, transmission system relay, ECM
	4A	Transmission fluid temperature (TFT) sensor – low input	Wiring short circuit to earth, TFT sensor, ECM
	4B	Transmission fluid temperature (TFT) sensor – high input	Wiring short circuit to positive, TFT sensor, ECM
41	0B	Alternator, field control – circuit malfunction	Wiring open circuit/short circuit, alternator, battery

**CHRYSLER**

Model: Cherokee 2,5/4,0 • Grand Cherokee 4,0/5,2 • Wrangler 2,5/4,0



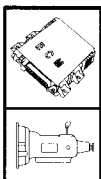
Engine management/transmission

Flash type	Hex type	Fault location	Probable cause
42		Fuel pump relay/engine control relay/fuel level sensor – circuit malfunction	Wiring open circuit/short circuit, fuel pump relay, engine control relay, fuel level sensor
	0A	Engine control relay	Wiring open circuit/short circuit, engine control relay
	2C	Engine control relay	Wiring open circuit, engine control relay
	65	Fuel pump relay	Wiring open circuit/short circuit, fuel pump relay
	95	Fuel level sensor – low input	Wiring open circuit, fuel level sensor
	96	Fuel level sensor – high input	Wiring short circuit to positive, fuel level sensor
	97	Fuel level sensor – malfunction	Wiring, fuel level sensor
43		Random/multiple cylinder(s) – misfire detected	Wiring, spark plug(s), HT lead(s), injector(s), ignition coil(s), low compression
	6A	Random/multiple cylinder(s) – misfire detected	Wiring, spark plug(s), HT lead(s), injector(s), ignition coil(s), low compression
	6B	Cylinder 1 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
	6C	Cylinder 2 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
	6D	Cylinder 3 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
	6E	Cylinder 4 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
	AE	Cylinder 5 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
	AF	Cylinder 6 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
	B0	Cylinder 7 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
	B1	Cylinder 8 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
	2B	Ignition coil A, primary – circuit malfunction	Wiring, ignition coil
44		Battery ambient temperature sensor – voltage low/high	Wiring, battery ambient temperature sensor, ECM
	9A	Battery ambient temperature sensor – voltage high	Wiring, battery ambient temperature sensor, ECM
	99	Battery ambient temperature sensor – voltage low	Wiring, battery ambient temperature sensor, ECM
45		Transmission control system – malfunction	Wiring, transmission fluid level, transmission mechanical fault, PNP switch, TCC solenoid, TFT sensor, TFP solenoid, shift solenoid, overdrive solenoid/switch, governor pressure solenoid, transmission system relay, ECM
	32	Shift solenoid (SS) 3-4 – electrical	Wiring, shift solenoid, ECM
	4A	Transmission fluid temperature (TFT) sensor – low input	Wiring short circuit to earth, TFT sensor, ECM
	4B	Transmission fluid temperature (TFT) sensor – high input	Wiring short circuit to positive, TFT sensor, ECM
	8D	Governor pressure not equal to target (15-20 PSI) – mid pressure malfunction	Signal wire open circuit/short circuit, valve body, sensor supply wire open circuit, transmission fluid level, governor pressure solenoid, transmission mechanical fault, ECM – no 5 volt supply



Flash type	Hex type	Fault location	Probable cause
45	8E	Governor pressure not equal to target – low pressure malfunction	Signal wire open circuit/short circuit, valve body, sensor supply wire open circuit, transmission fluid level, governor pressure solenoid, transmission mechanical fault, ECM – no 5 volt supply
	A4	Transmission fluid temperature (TFT) sensor – range/performance problem	Wiring, TFT sensor
	A5	Gear selection, 3-4 – shift malfunction	Wiring, TR sensor, shift solenoids, transmission mechanical fault
	A7	Governor pressure sensor – signal low	Signal wire short circuit to earth, supply wire open circuit, transmission fluid level, governor pressure sensor, ECM
	A8	Governor pressure sensor – signal high	Signal wire short circuit to positive, supply wire open circuit, transmission fluid level, governor pressure sensor, ECM
	A9	Governor pressure sensor – incorrect signal	Signal wire short circuit to earth/positive, supply wire open circuit/short circuit, transmission fluid level, governor pressure solenoid, governor pressure sensor, ECM
	AB	Transmission fluid pressure (TFP) solenoid – electrical	Wiring, TFP solenoid, ECM
	AD	Transmission system relay	Wiring open circuit/short circuit, transmission system relay, ECM
	BC	Overdrive solenoid/switch – performance problem	Wiring, overdrive solenoid/switch, transmission mechanical fault, ECM
46	06	Alternator – voltage high	Wiring, battery, alternator
47	05	Alternator – voltage low	Wiring, battery, alternator drive belt, alternator
51	77	System too lean	Wiring, intake/exhaust leak, MAP sensor, fuel pressure/pump, EVAP canister purge valve, injector(s), HO2S
52	76	System too rich	Wiring, intake blocked, EVAP canister purge valve, fuel pressure, EGR system, injector(s), air filter blocked, ignition system, HO2S
53		Engine control module (ECM) – internal fault	ECM
	02	Engine control module (ECM) – internal fault	ECM
	44	Engine control module (ECM) – internal fault	ECM
54	01	Camshaft position (CMP) sensor – no signal	Wiring, CMP sensor
55		End of MIL code output	–
63	31	Engine control module (ECM) – EEPROM error	ECM
72	70	Catalytic converter system, bank 1 – efficiency below threshold	Catalytic converter, wiring, HO2S 2
77	52	Cruise control	Wiring, cruise control vacuum switching valve



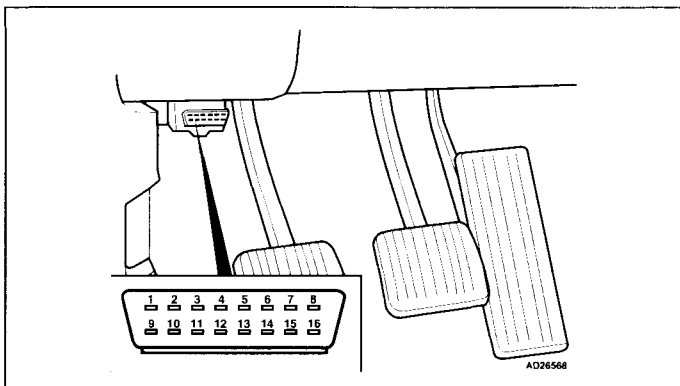


# CHRYSLER

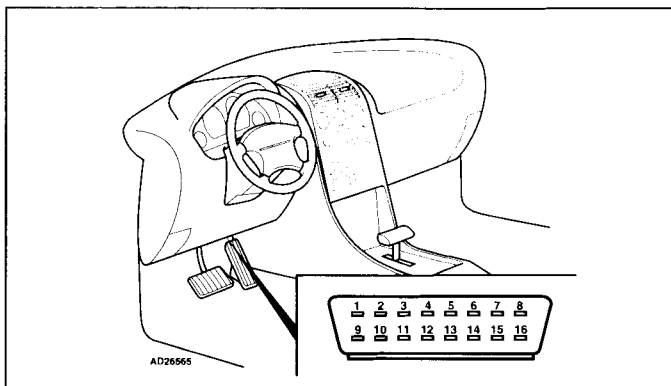
Model: Cherokee 2,5/4,0 • Grand Cherokee 4,0/5,2/5,9  
Wrangler 2,5/4,0  
Year: 1998  
Engine code: VIN position 8 = P, S, Y, Z  
System: JTEC

## Engine management/transmission

### Data link connector (DLC) locations



Cherokee, Wrangler



Grand Cherokee

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification – EOBD type

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1195	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Wiring, heating inoperative, HO2S
P1197	Heated oxygen sensor (HO2S) 2, bank 1 – slow response	Wiring, heating inoperative, HO2S
P1281	Engine temperature low for long period	Wiring, engine cooling system, coolant thermostat, ECT sensor
P1282	Fuel pump relay	Wiring open circuit/short circuit, fuel pump relay
P1294	Idle speed control (ISC) system – rpm lower/higher than expected	Wiring, air leak, throttle valve tight/sticking, IAC valve
P1296	Manifold absolute pressure (MAP) sensor – no 5 volt supply	Wiring, ECM
P1297	Manifold absolute pressure (MAP) sensor	Wiring, hose connection(s), MAP sensor
P1388	Engine control relay	Wiring open circuit/short circuit, engine control relay



## Engine management/transmission

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1389	Engine control relay	Wiring open circuit, engine control relay
P1391	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – intermittent signal	Wiring, poor connection, air gap, CKP sensor, CMP sensor
P1398	Engine control module (ECM) – misfire detection limit reached	Wiring, poor connection, CKP sensor
P1486	Evaporative emission (EVAP) system – blockage detected	Hose connection(s), hose blocked/trapped, EVAP canister
P1492	Battery ambient temperature sensor – voltage high	Wiring, battery ambient temperature sensor
P1493	Battery ambient temperature sensor – voltage low	Wiring, battery ambient temperature sensor
P1494	Evaporative emission (EVAP) leak detection pump – pressure switch	Wiring, hose leak/blockage, EVAP leak detection pump
P1495	Evaporative emission (EVAP) leak detection pump solenoid	Wiring open circuit/short circuit, hose leak/blockage, EVAP leak detection pump solenoid
P1594	Alternator – voltage high	Wiring, battery, alternator
P1595	Cruise control	Wiring open circuit/short circuit, hoses, cruise control master switch, cruise control vacuum switching valve
P1596	Cruise control master switch – high voltage	Wiring, cruise control master switch
P1597	Cruise control master switch – low voltage	Wiring, cruise control master switch
P1683	Cruise control	Wiring, cruise control vacuum switching valve
P1696	Engine control module (ECM) – EEPROM error	ECM
P1762	Governor pressure sensor – incorrect signal	Signal wire short circuit to earth/positive, supply wire open circuit/short circuit, transmission fluid level, governor pressure solenoid, governor pressure sensor, ECM
P1763	Governor pressure sensor – signal high	Signal wire short circuit to positive, supply wire open circuit, transmission fluid level, governor pressure sensor, ECM
P1764	Governor pressure sensor – signal low	Signal wire short circuit to earth, supply wire open circuit, transmission fluid level, governor pressure sensor, ECM
P1765	Transmission system relay	Wiring open circuit/short circuit, transmission system relay, ECM
P1756	Governor pressure not equal to target (15-20 PSI) – mid pressure malfunction	Signal wire open circuit/short circuit, valve body, sensor supply wire open circuit, transmission fluid level, governor pressure solenoid, transmission mechanical fault, ECM – no 5 volt supply
P1757	Governor pressure not equal to target – low pressure malfunction	Signal wire open circuit/short circuit, valve body, sensor supply wire open circuit, transmission fluid level, governor pressure solenoid, transmission mechanical fault, ECM – no 5 volt supply
P1899	Park/neutral position (PNP) switch – input circuit malfunction	Wiring, PNP switch, ECM/TCM



**CHRYSLER**

Model: Cherokee 2,5/4,0 • Grand Cherokee 4,0/5,2/5,9 • Wrangler 2,5/4,0

Engine management/transmission

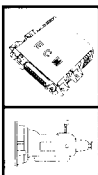
**Trouble code identification – Hex type**

Hex type	Fault location	Probable cause
00	DTC error	–
01	Camshaft position (CMP) sensor – no signal	Wiring, CMP sensor
02	Engine control module (ECM) – internal fault	ECM
05	Alternator – voltage low	Wiring, battery, alternator drive belt, alternator
06	Alternator – voltage high	Wiring, battery, alternator
0A	Engine control relay	Wiring open circuit/short circuit, engine control relay
0B	Alternator, field control – circuit malfunction	Wiring open circuit/short circuit, alternator, battery
0C	Torque converter clutch (TCC) solenoid – electrical	Wiring open circuit/short circuit, TCC solenoid
0F	Cruise control	Wiring open circuit/short circuit, hoses, cruise control master switch, cruise control vacuum switching valve
10	AC compressor clutch relay	Wiring open circuit/short circuit, AC compressor clutch relay
12	Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring open circuit/short circuit, EVAP canister purge valve
13	Injector 3 – circuit malfunction	Wiring, injector
14	Injector 2 – circuit malfunction	Wiring, injector
15	Injector 1 – circuit malfunction	Wiring, injector
19	Idle speed control (ISC) system – malfunction	Wiring open circuit/short circuit, IAC valve
1A	Throttle position (TP) sensor – low input	Wiring short circuit to earth, TP sensor
1B	Throttle position (TP) sensor – high input	Wiring short circuit to positive, TP sensor
1E	Engine coolant temperature (ECT) sensor – low input	Wiring short circuit to earth, coolant thermostat, ECT sensor
1F	Engine coolant temperature (ECT) sensor – high input	Wiring open circuit/short to positive, coolant thermostat, earth wire defective, ECT sensor
21	Engine temperature low for long period	Wiring, engine cooling system, coolant thermostat, ECT sensor
23	Vehicle speed sensor (VSS) – signal	Wiring, VSS
24	Manifold absolute pressure (MAP) sensor – low input	Wiring short circuit to earth, MAP sensor
25	Manifold absolute pressure (MAP) sensor – high input	Wiring short circuit to positive, MAP sensor
27	Manifold absolute pressure (MAP) sensor	Wiring, hose connection(s), MAP sensor
28	Crankshaft position (CKP) sensor – no signal	Wiring, air gap, CKP sensor
2B	Ignition coil A, primary/secondary – circuit malfunction	Wiring, ignition coil
2C	Engine control relay	Wiring open circuit, engine control relay
31	Engine control module (ECM) – EEPROM error	ECM
32	Shift solenoid (SS) A – electrical	Wiring, shift solenoid, ECM/TCM
39	Intake air temperature (IAT) sensor – low input	Wiring short circuit to earth, IAT sensor
3A	Intake air temperature (IAT) sensor – high input	Wiring open circuit/short to positive, earth wire defective, IAT sensor



## Engine management/transmission

Hex type	Fault location	Probable cause
3D	Injector 4 – circuit malfunction	Wiring, injector
3E	Heated oxygen sensor (HO2S) 1, bank 1 – high voltage	Wiring short circuit to positive, fuel pressure, injector control, EVAP canister purge valve, air filter blocked, HO2S
44	Engine control module (ECM) – internal fault	ECM
45	Injector 5 – circuit malfunction	Wiring, injector
46	Injector 6 – circuit malfunction	Wiring, injector
4A	Transmission fluid temperature (TFT) sensor – low input	Wiring short circuit to earth, TFT sensor, ECM
4B	Transmission fluid temperature (TFT) sensor – high input	Wiring short circuit to positive, TFT sensor, ECM
4F	Injector 7 – circuit malfunction	Wiring, injector
50	Injector 8 – circuit malfunction	Wiring, injector
52	Cruise control	Wiring, cruise control vacuum switching valve
56	Cruise control master switch – high voltage	Wiring, cruise control master switch
57	Cruise control master switch – low voltage	Wiring, cruise control master switch
65	Fuel pump relay	Wiring open circuit/short circuit, fuel pump relay
66	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Wiring, heating inoperative, HO2S
67	Heated oxygen sensor (HO2S) 1, bank 1 – heater control – circuit malfunction	Wiring, HO2S
69	Heated oxygen sensor (HO2S) 2, bank 1, heater control – circuit malfunction	Wiring, HO2S
6A	Random/multiple cylinder(s) – misfire detected	Wiring, spark plug(s), HT lead(s), injector(s), ignition coil(s), low compression
6B	Cylinder 1 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
6C	Cylinder 2 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
6D	Cylinder 3 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
6E	Cylinder 4 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
70	Catalytic converter system, bank 1 – efficiency below threshold	Wiring, HO2S 2, catalytic converter
71	Evaporative emission (EVAP) system – incorrect flow detected	Hose connection(s), intake leak, EVAP canister purge valve
72	Park/neutral position (PNP) switch – input circuit malfunction	Wiring, PNP switch, ECM/TCM
76	System too rich	Wiring, intake blocked, EVAP canister purge valve, fuel pressure, EGR system, injector(s), air filter blocked, ignition system, HO2S
77	System too lean	Wiring, intake/exhaust leak, MAP sensor, fuel pressure/pump, EVAP canister purge valve, injector(s), HO2S
7E	Heated oxygen sensor (HO2S) 2, bank 1 – high voltage	Wiring short circuit to positive, catalytic converter, HO2S

**CHRYSLER**

Model: Cherokee 2,5/4,0 • Grand Cherokee 4,0/5,2/5,9 • Wrangler 2,5/4,0

## Engine management/transmission

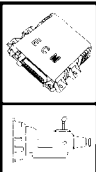
Hex type	Fault location	Probable cause
80	Insufficient coolant temperature for closed loop fuel control	Wiring, engine cooling system, coolant thermostat, ECT sensor
84	Throttle position (TP) sensor – range/performance problem	Wiring, accelerator cable adjustment, TP sensor
87	Manifold absolute pressure (MAP) sensor – no 5 volt supply	Wiring, ECM
8A	Idle speed control (ISC) system – rpm lower/higher than expected	Wiring, air leak, throttle valve tight/sticking, IAC valve
8D	Governor pressure not equal to target (15-20 PSI) – mid pressure malfunction	Signal wire open circuit/short circuit, valve body, sensor supply wire open circuit, transmission fluid level, governor pressure solenoid, transmission mechanical fault, ECM – no 5 volt supply
8E	Governor pressure not equal to target – low pressure malfunction	Signal wire open circuit/short circuit, valve body, sensor supply wire open circuit, transmission fluid level, governor pressure solenoid, transmission mechanical fault, ECM – no 5 volt supply
94	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid
95	Fuel level sensor – low input	Wiring open circuit, fuel level sensor
96	Fuel level sensor – high input	Wiring short circuit to positive, fuel level sensor
97	Fuel level sensor – malfunction	Wiring, fuel level sensor
99	Battery ambient temperature sensor – voltage low	Wiring, battery ambient temperature sensor
9A	Battery ambient temperature sensor – voltage high	Wiring, battery ambient temperature sensor
9B	Heated oxygen sensor (HO2S) 1, bank 1 – low voltage	Wiring short circuit to earth, exhaust leak, HO2S
9C	Heated oxygen sensor (HO2S) 2, bank 1 – low voltage	Wiring short circuit to earth, exhaust leak, HO2S
9D	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – intermittent signal	Wiring, poor connection, air gap, CKP sensor, CMP sensor
A0	Evaporative emission (EVAP) system – small leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
A1	Evaporative emission (EVAP) system – large leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
A4	Transmission fluid temperature (TFT) sensor – range/performance problem	Wiring, TFT sensor
A5	Gear selection, 3-4 – shift malfunction	Wiring, TR sensor, shift solenoids, transmission mechanical fault
A6	Output shaft speed (OSS) sensor – circuit malfunction	Wiring, OSS sensor, ECM
A7	Governor pressure sensor – signal low	Signal wire short circuit to earth, supply wire open circuit, transmission fluid level, governor pressure sensor, ECM
A8	Governor pressure sensor – signal high	Signal wire short circuit to positive, supply wire open circuit, transmission fluid level, governor pressure sensor, ECM
A9	Governor pressure sensor – incorrect signal	Signal wire short circuit to earth/positive, supply wire open circuit/short circuit, transmission fluid level, governor pressure solenoid, governor pressure sensor, ECM
AB	Transmission fluid pressure (TFP) solenoid – electrical	Wiring, TFP solenoid, ECM
AD	Transmission system relay	Wiring open circuit/short circuit, transmission system relay, ECM





Hex type	Fault location	Probable cause
AE	Cylinder 5 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
AF	Cylinder 6 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
B0	Cylinder 7 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
B1	Cylinder 8 – misfire detected	Wiring, engine mechanical fault, ignition/fuel system, injector
B7	Evaporative emission (EVAP) leak detection pump solenoid	Wiring open circuit/short circuit, hose leak/blockage, EVAP leak detection pump solenoid
B8	Evaporative emission (EVAP) leak detection pump – pressure switch	Wiring, hose leak/blockage, EVAP leak detection pump
BA	Engine control module (ECM) – misfire detection limit reached	Wiring, poor connection, CKP sensor
BB	Evaporative emission (EVAP) system – blockage detected	Hose connection(s), hose blocked/trapped, EVAP canister
BC	Overdrive solenoid/switch – performance problem	Wiring, overdrive solenoid/switch, transmission mechanical fault, ECM
C0	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Wiring, heating inoperative, HO2S
C2	Heated oxygen sensor (HO2S) 2, bank 1 – slow response	Wiring, heating inoperative, exhaust leak, HO2S



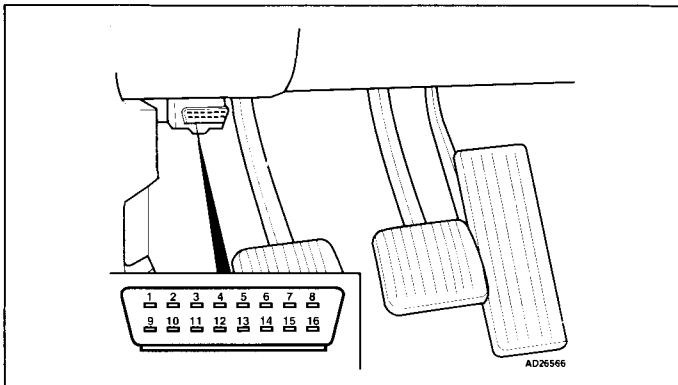


# CHRYSLER

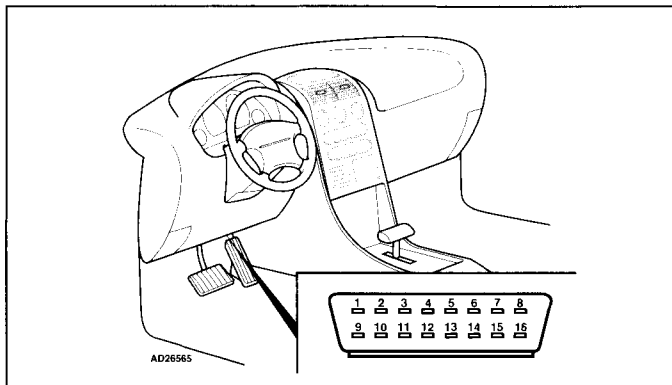
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Wrangler 2,5/4,0  
Year: 1999-02  
Engine code: VIN position 8 = N, P, S  
System: JTEC

Engine management/transmission

## Data link connector (DLC) locations



Cherokee/Wrangler



Grand Cherokee

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Malfunction indicator lamp (MIL) will illuminate or flash if certain faults are recorded.
- ECM operates in emergency mode if sensors fail, to enable vehicle to be driven to workshop.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1110	Decreased engine performance – high intake air temperature	Wiring open circuit/short to positive, earth wire defective, IAT sensor, ECT sensor, engine cooling system, high engine bay temperature, ECM
P1192	Intake air temperature (IAT) sensor – voltage low	Wiring, IAT sensor, ECM
P1193	Intake air temperature (IAT) sensor – voltage high	Wiring, IAT sensor, ECM
P1194	Heated oxygen sensor (HO2S), heater control – circuit malfunction	Wiring, HO2S, ECM



<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1195	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Wiring, heating inoperative, exhaust leak, HO2S
P1196	Heated oxygen sensor (HO2S) 1, bank 2 – slow response	Wiring, heating inoperative, exhaust leak, HO2S
P1197	Heated oxygen sensor (HO2S) 2, bank 1 – slow response	Wiring, heating inoperative, exhaust leak, HO2S
P1280	Fuel pump relay – circuit malfunction	Wiring, fuel pump relay
P1281	Engine temperature low for long period	Wiring, engine cooling system, coolant thermostat, ECT sensor
P1282	Fuel pump relay	Wiring open circuit/short circuit, fuel pump relay
P1294	Idle speed control (ISC) system – rpm lower/higher than expected	Wiring, air leak, throttle valve tight/sticking, IAC valve
P1295	Throttle position (TP) sensor – no 5 volt supply	Wiring, TP sensor, ECM
P1296	Manifold absolute pressure (MAP) sensor – no 5 volt supply	Wiring, MAP sensor, ECM
P1297	Manifold absolute pressure (MAP) sensor	Wiring, hose connection(s), MAP sensor
P1298	System too lean at prolonged wide open throttle	Intake/exhaust leak, MAP sensor, fuel pressure/pump, injector(s), HO2S
P1299	Manifold absolute pressure (MAP) sensor/throttle position (TP) sensor	Intake leak, hose connection(s), MAP sensor, TP sensor
P1388	Engine control relay	Wiring open circuit/short circuit, engine control relay
P1389	Engine control relay	Wiring open circuit, engine control relay
P1390	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – signal synchronisation	Timing belt loose/jumped position, CKP sensor, CMP sensor
P1391	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – intermittent signal	Wiring, poor connection, air gap, CKP sensor, CMP sensor
P1398	Engine control module (ECM) – misfire detection limit reached	Wiring, poor connection, CKP sensor
P1475	Engine control module (ECM) – auxiliary 5 volt output high	Wiring, ECM
P1478	Battery ambient temperature sensor – range/performance problem	Wiring, battery ambient temperature sensor
P1486	Evaporative emission (EVAP) system – blockage detected	Hose connection(s), hose blocked/trapped, EVAP canister
P1488	Engine control module (ECM) – auxiliary 5 volt output low	Wiring, ECM
P1491	Engine coolant blower motor relay – circuit malfunction	Wiring open circuit/short circuit, engine coolant blower motor
P1492	Battery ambient temperature sensor – voltage high	Wiring, battery ambient temperature sensor
P1493	Battery ambient temperature sensor – voltage low	Wiring, battery ambient temperature sensor
P1494	Evaporative emission (EVAP) leak detection pump – pressure switch	Wiring, hose leak/blockage, EVAP leak detection pump
P1495	Evaporative emission (EVAP) leak detection pump solenoid	Wiring open circuit/short circuit, hose leak/blockage, EVAP leak detection pump solenoid



**CHRYSLER**

Model: Cherokee 2,5/4,0 • Grand Cherokee 4,0/4,7 • Wrangler 2,5/4,0



Engine management/transmission

EOBD type	Fault location	Probable cause
P1496	Engine control module (ECM) – 5 volt output low	ECM
P1594	Alternator – voltage high	Wiring, battery, alternator
P1595	Cruise control	Wiring open circuit/short circuit, hoses, cruise control master switch, cruise control vacuum switching valve
P1596	Cruise control master switch – high voltage	Wiring, cruise control master switch
P1597	Cruise control master switch – low voltage	Wiring, cruise control master switch
P1598	AC refrigerant pressure sensor – high input	Wiring, AC refrigerant pressure too high (cooling fault/incorrectly charged), AC refrigerant pressure sensor
P1599	AC refrigerant pressure sensor – low input	Wiring, AC refrigerant pressure too low (incorrectly charged), AC refrigerant pressure sensor
P1602	Engine control module (ECM) not programmed	New ECM not programmed, incorrectly programmed, ECM
P1682	Alternator – voltage low	Wiring, battery, alternator drive belt, alternator
P1683	Cruise control	Wiring, cruise control vacuum switching valve
P1684	Engine control module (ECM) – supply voltage disconnected within last 50 ignition switch ON-OFF cycles	Wiring, battery
P1685	Key not programmed into immobilizer control module	Wiring, ignition key not matched/damaged, immobilizer control module
P1686	CAN data bus, immobilizer control module – no signal	Wiring, immobilizer control module
P1696	Engine control module (ECM) – EEPROM error	ECM
P1756	Governor pressure not equal to target (15-20 PSI) – mid pressure malfunction	Signal wire open circuit/short circuit, valve body, sensor supply wire open circuit, transmission fluid level, governor pressure solenoid, transmission mechanical fault, ECM – no 5 volt supply
P1757	Governor pressure not equal to target (15-20 PSI) – zero pressure malfunction	Signal wire open circuit/short circuit, valve body, sensor supply wire open circuit, transmission fluid level, governor pressure solenoid, transmission mechanical fault, ECM – no 5 volt supply
P1762	Governor pressure sensor – incorrect signal	Signal wire short circuit to earth/positive, supply wire open circuit/short circuit, transmission fluid level, governor pressure solenoid, governor pressure sensor, ECM
P1763	Governor pressure sensor – signal high	Signal wire short circuit to positive, supply wire open circuit, transmission fluid level, governor pressure sensor, ECM
P1764	Governor pressure sensor – signal low	Signal wire short circuit to earth, supply wire open circuit, transmission fluid level, governor pressure sensor, ECM
P1765	Transmission system relay	Wiring open circuit/short circuit, transmission system relay, ECM
P1899	Park/neutral position (PNP) switch – input circuit malfunction	Wiring, PNP switch, ECM

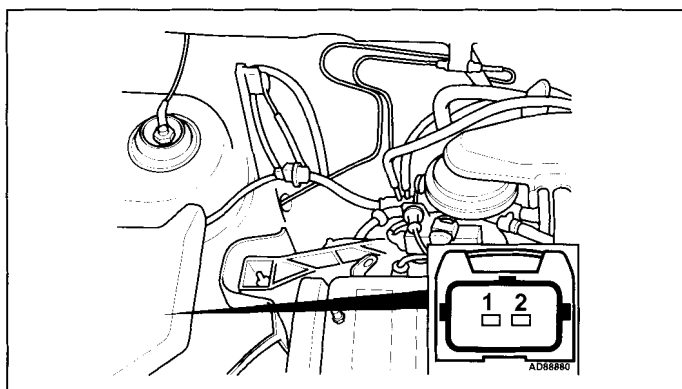




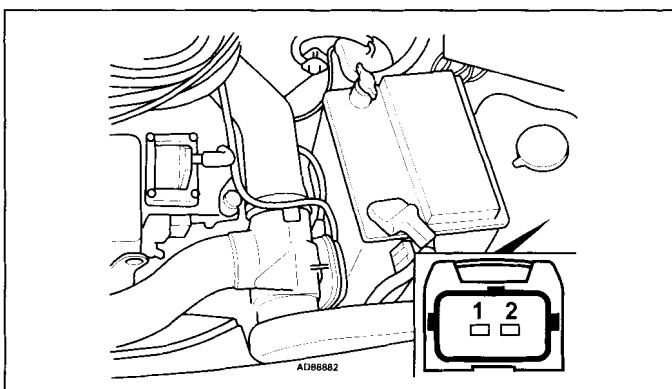
Model: AX 1,0/1,1/1,4 • C15 1,1/1,4 • ZX 1,1/1,4/1,6/1,8/2,0 • XM 2,0/3,0 • Jumper/Relay 2,0  
 Year: 1989-00  
 Engine code: BDY, BFZ, CDY, CDZ, HDY, HDZ, K6B, KDX, KDY, KDZ, KFZ, KFY, LFZ, RFT, RFV, RFW, RFX, RFY, RFZ, RGY, SFZ, SKZ  
 System: Bosch Mono-Jetronic A2.2 • Bosch Mono-Motronic MA3.0 • Bosch Motronic MP3.1/3.2/5.1/5.1.1  
 Magneti Marelli G6 • Magneti Marelli Monopoint G6.11 • Magneti Marelli 8P.10/11/13/20 • Fenix 3B/4

## Engine management

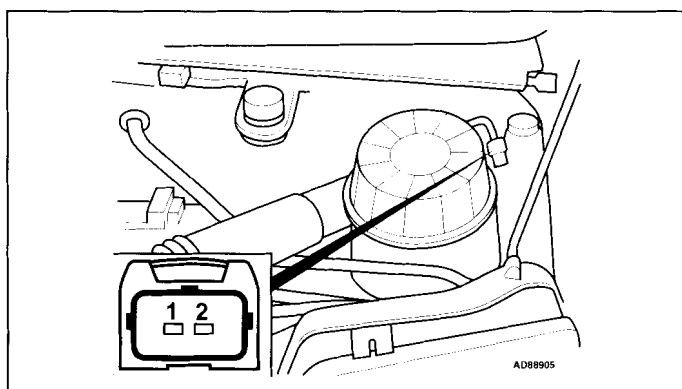
### Data link connector (DLC) locations



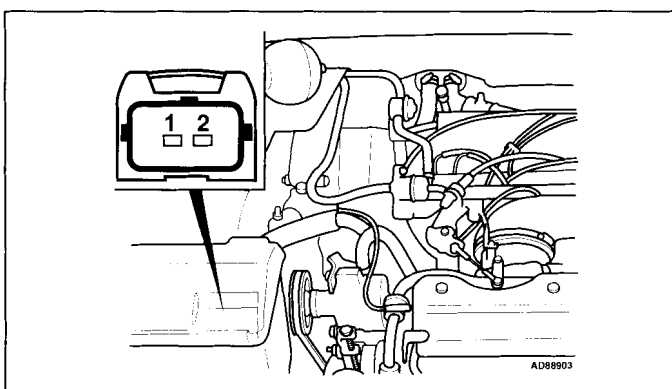
AX, C15 – RH engine bay



ZX – LH engine bay



Jumper/Relay – LH engine bay



XM – RH engine bay

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL) or LED.
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Vehicles fitted with a coded keypad: When switching on ignition or entering start code ensure diagnostic equipment is disconnected from the data link connector (DLC).

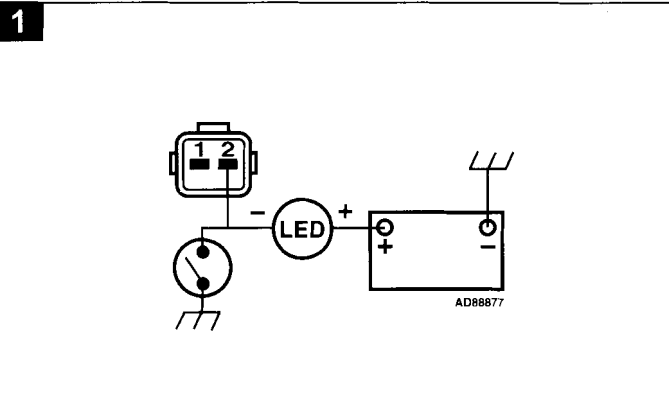
#### Accessing

- Switch ignition ON.
- Check that MIL illuminates.
- Connect LED test lamp between green data link connector (DLC) terminal 2 and battery positive **1**.
- Bridge data link connector (DLC) terminal 2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Each trouble code consists of two groups of one or more flashes **2**.
- Long flashes indicate the 'tens' of the trouble code **2** [A].
- Short flashes indicate the 'units' of the trouble code **2** [C].
- A short pause separates each flash **2** [B].
- A long pause separates each trouble code **2** [D].



## Engine management

- For example: Trouble code 12 displayed **2**.
- Repeat operation.
- Count LED or MIL flashes. Note trouble codes. Compare with trouble code table.



### Erasing

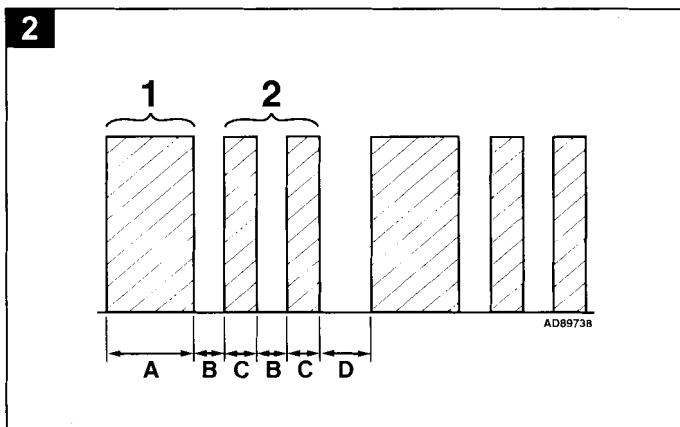
#### Method 1

- Switch ignition ON.
- Connect LED test lamp between data link connector (DLC) terminal 2 and battery positive **1**.
- Bridge data link connector (DLC) terminal 2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Repeat switch operation until code 11 is displayed.
- Operate switch for 10-20 seconds.
- Switch ignition OFF.

#### Method 2

- Ensure ignition switched OFF.
- Disconnect battery earth lead for 10 seconds.

**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).



### Trouble code identification

Flash type	Fault location	Probable cause
11	End of sequence	–
12	Start of sequence	–
13	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
14	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
15	Relay module/fuel pump relay	Wiring, fuel pump relay, relay module – fuel pump contacts, ECM
21 <b>1</b>	Closed throttle position (CTP) switch	Wiring, CTP switch, accelerator cable adjustment, ECM
21 <b>2</b>	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
22 <b>3</b>	Closed throttle position (CTP) switch	Wiring, CTP switch, accelerator cable adjustment, ECM
22 <b>4</b>	Idle air control (IAC) valve/idle speed control (ISC) actuator	Wiring, IAC valve/ISC actuator, ECM
23	Idle air control (IAC) valve – idle speed incorrect	Wiring, accelerator cable adjustment, hoses blocked/leaking, fuel pump relay, IAC valve, ECM
25	Intake manifold air control solenoid 1	Wiring, intake manifold air control solenoid, ECM
26	Intake manifold air control solenoid 2	Wiring, intake manifold air control solenoid, ECM



Flash type	Fault location	Probable cause
27	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
31 ■	Mixture control (MC), bank 1	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
31 6	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
32 5	Mixture control (MC), bank 2	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
32 6	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
33 1	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
33 2	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, hoses blocked/leaking, ECM
34	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
36	Oxygen sensor heater relay	Wiring, oxygen sensor heater relay, ECM
41	Crankshaft position (CKP) sensor/ engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
42 7	Injector(s)	Wiring, relay module, injector(s), ECM
42 3	Injector/fuel pump	Wiring, injector, fuel pump, relay module, ECM
43	Knock control	Wiring, KS, mechanical fault, incorrect fuel, ignition system, ECM
44	Knock sensor (KS) 1	Wiring, KS, ECM
45	Ignition coil 1 – cylinder 1 & 4	Wiring, ignition coil, ECM
46	Turbocharger (TC) wastegate regulating valve	Wiring, hoses blocked/leaking, TC wastegate regulating valve, ECM
47	Turbocharger (TC) wastegate regulation	TC wastegate regulating valve, MAP sensor, TP sensor, exhaust leak, intake leak
51	Heated oxygen sensor (HO2S) 1	Wiring, HO2S, exhaust leak, relay module, oxygen sensor heater relay, ECM
52 5	Mixture control (MC), bank 1	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
52 6	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
53	Battery voltage	Wiring, battery discharged, alternator
54	Engine control module (ECM)	Wiring, battery, ECM
56	Coded keypad	Wiring, coded keypad, ECM
57	Ignition coil 2 – cylinders 2 & 3	Wiring, ignition coil, ECM
62	Knock sensor (KS) 2	Wiring, KS, ECM
63	Heated oxygen sensor (HO2S) 2	Wiring, HO2S, exhaust leak, relay module, oxygen sensor heater relay, ECM
64	Mixture control (MC), bank 2	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM



**CITROEN**Model: AX 1,0/1,1/1,4 • C15 1,1/1,4 • ZX 1,1/1,4/1,6/1,8/2,0 • XM 2,0/3,0  
Jumper/Relay 2,0**Engine management**

Flash type	Fault location	Probable cause
65	Camshaft position (CMP) sensor	Wiring, CMP sensor, ECM
71	Injector 1	Wiring, relay module, injector, ECM
72	Injector 2	Wiring, relay module, injector, ECM
73	Injector 3	Wiring, relay module, injector, ECM
74	Injector 4	Wiring, relay module, injector, ECM
75	Injector 5	Wiring, relay module, injector, ECM
76	Injector 6	Wiring, relay module, injector, ECM

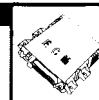
- 1** Bosch Mono-Jetronic A2.2
- 2** Except Bosch Mono-Jetronic A2.2
- 3** Bosch Mono-Motronic MA3.0
- 4** All systems
- 5** Fenix 4
- 6** Except Fenix 4
- 7** Except Bosch MP3.2/Fenix 3B/4





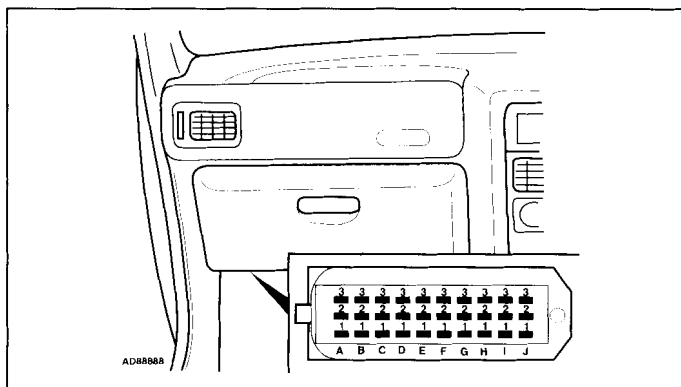
Model: Saxo 1,0/1,1 • Berlingo 1,1/1,4  
 Year: 1996-98  
 Engine code: CDY, CDZ, HDY, HDZ, KFX  
 System: Bosch Mono-Motronic MA3.1

**CITROEN**

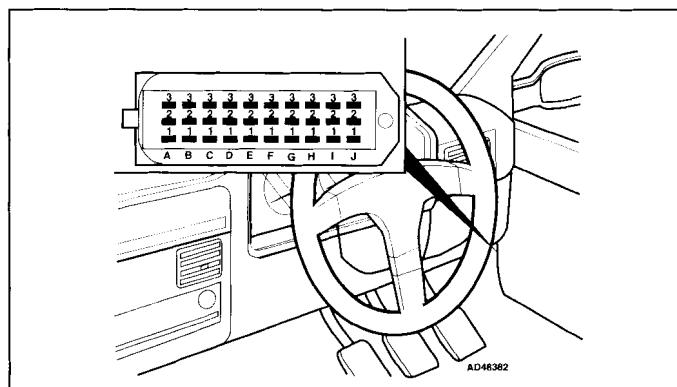


Engine management

## Data link connector (DLC) locations



Saxo – under fascia, passenger's side



Berlingo – under fascia, driver's side

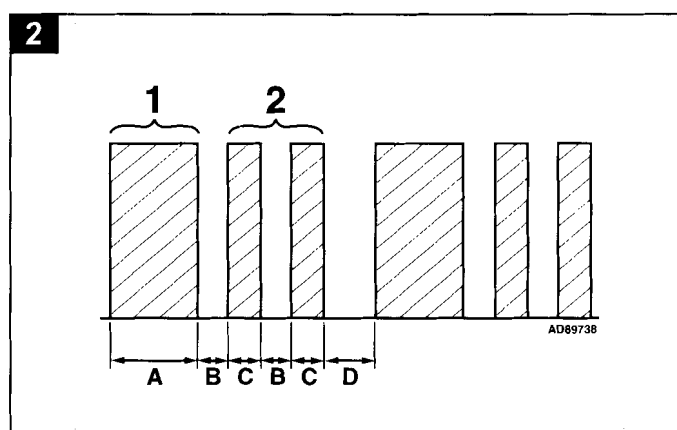
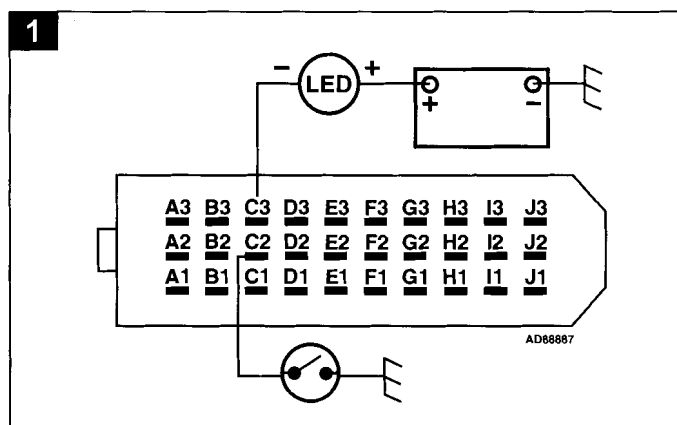
## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL) or LED.
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Vehicles fitted with a coded keypad: When switching on ignition or entering start code ensure diagnostic equipment is disconnected from the data link connector (DLC).

### Accessing

- Switch ignition ON.
- Check that MIL illuminates.
- Connect LED test lamp between data link connector (DLC) terminal C3 and battery positive **1**.
- Bridge data link connector (DLC) terminal C2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Each trouble code consists of one or two groups of one or more flashes **2**.
- Long flashes indicate the 'tens' of the trouble code **2** [A].
- Short flashes indicate the 'units' of the trouble code **2** [C].
- A short pause separates each flash **2** [B].
- A long pause separates each trouble code **2** [D].
- For example: Trouble code 12 displayed **2**.
- Repeat operation. Note trouble codes.
- Compare with trouble code table. Rectify faults as necessary.





## Engine management

### Erasing

#### Method 1

- Switch ignition ON.
- Connect LED test lamp between data link connector (DLC) terminal C3 and battery positive **1**.
- Bridge data link connector (DLC) terminal C2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Repeat switch operation until code 11 is displayed.
- Operate switch for 10-20 seconds.
- Switch ignition OFF.

#### Method 2

- Ensure ignition switched OFF.
- Disconnect battery earth lead for 10 seconds.

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

### Trouble code identification

Flash type	Fault location	Probable cause
1	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
2	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
3	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
4	Closed throttle position (CTP) switch	Wiring, CTP switch, accelerator cable adjustment, ECM
5	Idle speed control (ISC) actuator	Wiring, ISC actuator, ECM
6	Crankshaft position (CKP) sensor/ engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
7	Mixture control (MC) – mixture rich	Wiring, incorrect fuel, heated oxygen sensor (HO2S) – heater circuit, exhaust blockage, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
8	Mixture control (MC) – mixture lean	Wiring, incorrect fuel, heated oxygen sensor (HO2S) – heater circuit, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, ignition system, ECM
9	Heated oxygen sensor (HO2S)	Wiring, HO2S, exhaust leak, relay module, ECM
10	Relay module	Wiring, relay module – fuel pump contacts, ECM
11	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
12	Injector	Wiring, relay module, injector, ECM
13	Ignition coil 1 – cylinders 1 & 4	Wiring, ignition coil, ECM
14	Ignition coil 2 – cylinders 2 & 3	Wiring, ignition coil, ECM
15	Battery voltage	Wiring, battery discharged, alternator
16	Engine control module (ECM)	Wiring, battery, ECM
17	Vehicle speed sensor (VSS)	Wiring, VSS, ECM



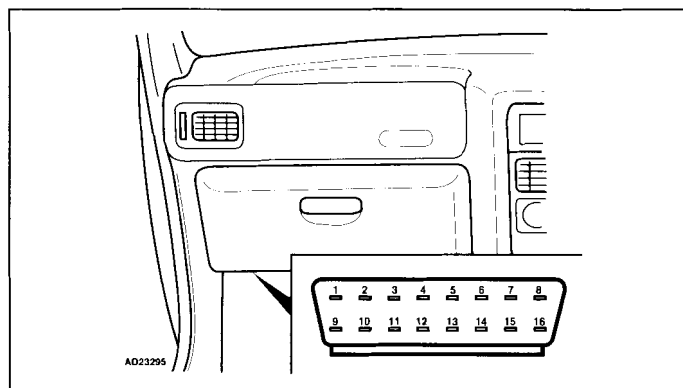
Model: Saxo 1,0/1,1 • Berlingo 1,1/1,4  
 Year: 1998-00  
 Engine code: CDY, CDZ, HDY, HDZ, KFX  
 System: Bosch Motronic MA3.1

**CITROEN**

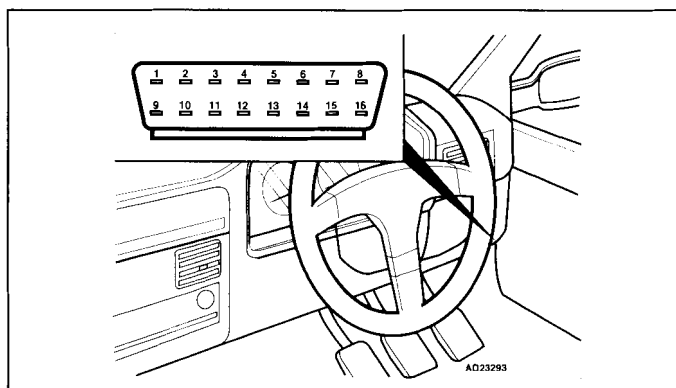


Engine management

## Data link connector (DLC) locations



Saxo – under fascia, passenger's side



Berlingo – under fascia, driver's side

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

Scanner type	Fault location	Probable cause
1	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
2	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
3	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
4	Closed throttle position (CTP) switch	Wiring, CTP switch, accelerator cable adjustment, ECM
5	Idle speed control (ISC) actuator	Wiring, ISC actuator, ECM
6	Crankshaft position (CKP) sensor/ engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
7	Mixture control (MC) – mixture rich	Wiring, incorrect fuel, heated oxygen sensor (HO2S) – heater circuit, exhaust blockage, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
8	Mixture control (MC) – mixture lean	Wiring, incorrect fuel, heated oxygen sensor (HO2S) – heater circuit, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, ignition system, ECM



**CITROEN**

Model: Saxo 1,0/1,1 • Berlingo 1,1/1,4

## Engine management

Scanner type	Fault location	Probable cause
9	Heated oxygen sensor (HO2S)	Wiring, HO2S, exhaust leak, relay module, ECM
10	Relay module	Wiring, relay module – fuel pump contacts, ECM
11	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
12	Injector	Wiring, relay module, injector, ECM
13	Ignition coil 1 – cylinders 1 & 4	Wiring, ignition coil, ECM
14	Ignition coil 2 – cylinders 2 & 3	Wiring, ignition coil, ECM
15	Battery voltage	Wiring, battery discharged, alternator
16	Engine control module (ECM)	Wiring, battery, ECM
17	Vehicle speed sensor (VSS)	Wiring, VSS, ECM



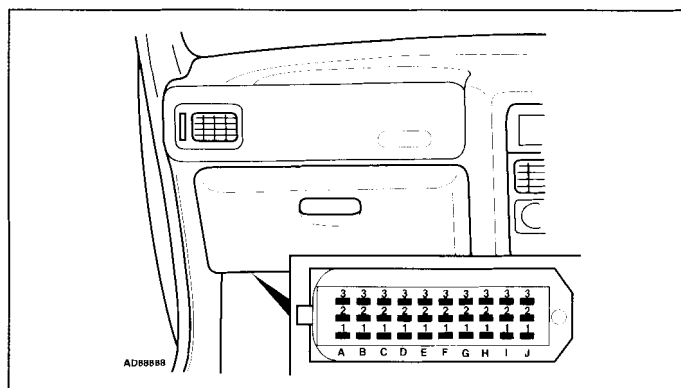
Model: Saxo 1,4/1,6 • Berlingo 1,4/1,8  
 Year: 1996-98  
 Engine code: KFX, LFX, NFX  
 System: Magneti Marelli 1AP/1AP20/1AP41

**CITROEN**

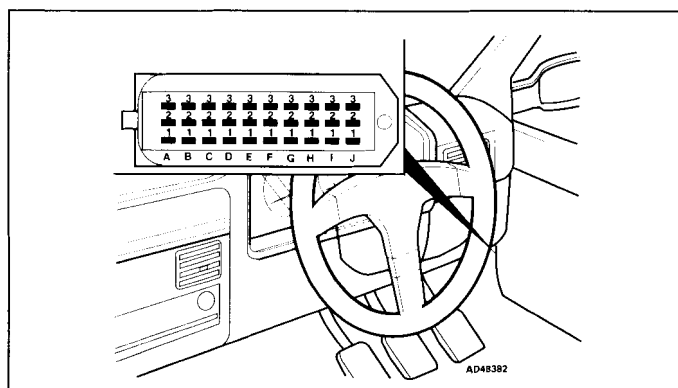


Engine management

## Data link connector (DLC) locations



Saxo – under fascia, passenger's side



Berlingo – under fascia, driver's side

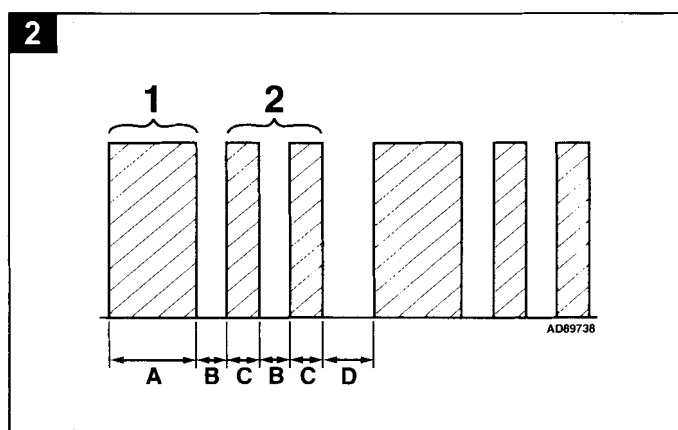
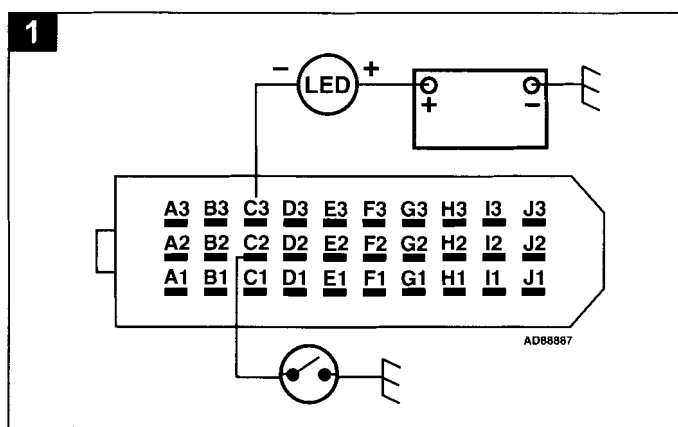
## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL) or LED.
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Vehicles fitted with a coded keypad: When switching on ignition or entering start code ensure diagnostic equipment is disconnected from the data link connector (DLC).

### Accessing

- Switch ignition ON.
- Check that MIL illuminates.
- Connect LED test lamp between data link connector (DLC) terminal C3 and battery positive **1**.
- Bridge data link connector (DLC) terminal C2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Each trouble code consists of one or two groups of one or more flashes **2**.
- Long flashes indicate the 'tens' of the trouble code **2** [A].
- Short flashes indicate the 'units' of the trouble code **2** [C].
- A short pause separates each flash **2** [B].
- A long pause separates each trouble code **2** [D].
- For example: Trouble code 12 displayed **2**.
- Repeat operation. Note trouble codes.
- Compare with trouble code table. Rectify faults as necessary.



**CITROEN**

Model: Saxo 1,4/1,6 • Berlingo 1,4/1,8

**Engine management****Erasing****Method 1**

- Switch ignition ON.
- Connect LED test lamp between data link connector (DLC) terminal C3 and battery positive **1**.
- Bridge data link connector (DLC) terminal C2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Repeat switch operation until code 11 is displayed.
- Operate switch for 10-20 seconds.
- Switch ignition OFF.

**Method 2**

- Ensure ignition switched OFF.
- Disconnect battery earth lead for 10 seconds.

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

**Trouble code Identification**

Flash type	Fault location	Probable cause
1	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
2	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
3	Relay module	Wiring, relay module – fuel pump contacts, ECM
4	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
5	Idle air control (IAC) valve	Wiring, IAC valve, ECM
6	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
7	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S) – heater circuit, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, ECM
8	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, hoses blocked/leaking, ECM
9	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
10	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
11	Injectors	Wiring, relay module, injectors, ECM
12	Ignition coil 1 – cylinders 1 & 4	Wiring, ignition coil, ECM
13	Ignition coil 2 – cylinders 2 & 3	Wiring, ignition coil, ECM
14	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S), intake/exhaust leak, fuel pressure, injector control, EVAP canister purge valve, ignition system, ECM
15	Battery voltage	Wiring, battery discharged, alternator
16	Engine control module (ECM)	Wiring, battery, ECM
17	Heated oxygen sensor (HO2S)	Wiring, HO2S, exhaust leak, relay module, ECM
18	Knock control	Wiring, KS, mechanical fault, incorrect fuel, ignition system, ECM
19	Knock sensor (KS)	Wiring, KS, ECM
20	Power steering pressure (PSP) sensor/switch	Wiring, PSP switch/sensor, power steering pump, power steering system pressure, ECM



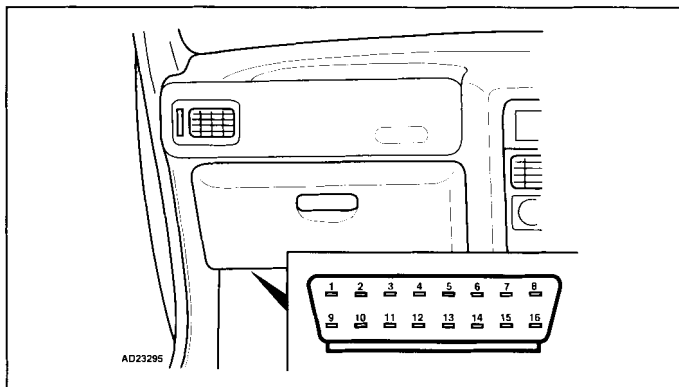
Model: Saxo 1,4/1,6 • Xsara 1,4/1,8 • Xantia 1,8  
Picasso 1,8 • Berlingo 1,4/1,8  
Year: 1997-00  
Engine code: 6FZ, KFX, KFW, LFX, LFY, NFX  
System: Magneti Marelli 1AP/20/40/41  
Sagem SL96/S2000

**CITROEN**

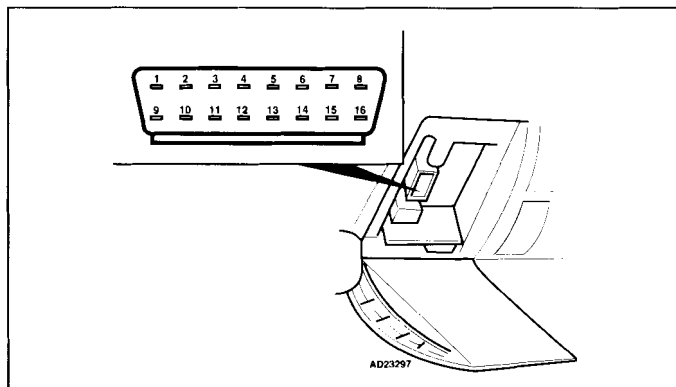


Engine management

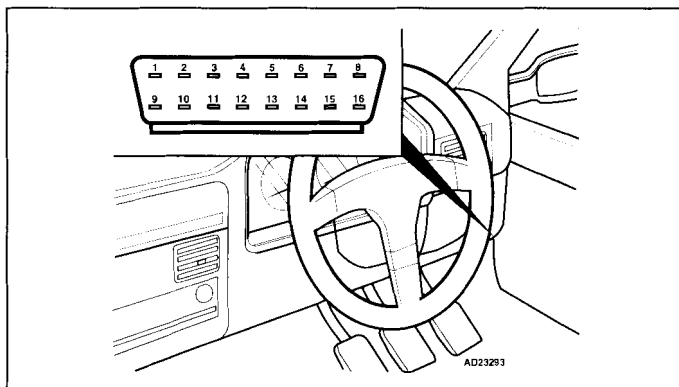
## Data link connector (DLC) locations



Saxo – under fascia, passenger's side



Xsara, Xantia, Picasso – in fascia fusebox



Berlingo – under fascia, driver's side

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**CITROEN**Model: Saxo 1,4/1,6 • Xsara 1,4/1,8 • Xantia 1,8 • Picasso 1,8  
Berlingo 1,4/1,8**Engine management****Trouble code identification**

Scanner type	Fault location	Probable cause
1	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
2	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
3	Relay module	Wiring, relay module – fuel pump contacts, ECM
4	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
5	Idle air control (IAC) valve	Wiring, IAC valve, ECM
6	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
7	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S) – heater circuit, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, ECM
8	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, hoses blocked/leaking, ECM
9	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
10	Crankshaft position (CKP) sensor/ engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
11	Injectors	Wiring, relay module, injector(s), ECM
12	Ignition coil 1 – cylinders 1 & 4	Wiring, ignition coil, ECM
13	Ignition coil 2 – cylinders 2 & 3	Wiring, ignition coil, ECM
14	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S), intake/exhaust leak, fuel pressure, injector control, EVAP canister purge valve, ignition system, ECM
15	Battery voltage	Wiring, battery discharged, alternator
16	Engine control module (ECM)	Wiring, battery, ECM
17	Heated oxygen sensor (HO2S)	Wiring, HO2S, exhaust leak, relay module, ECM
18	Knock control	Wiring, KS, mechanical fault, incorrect fuel, ignition system, ECM
19	Knock sensor (KS)	Wiring, KS, ECM
20	Power steering pressure (PSP) sensor/switch	Wiring, PSP switch/sensor, power steering pump, power steering system pressure, ECM





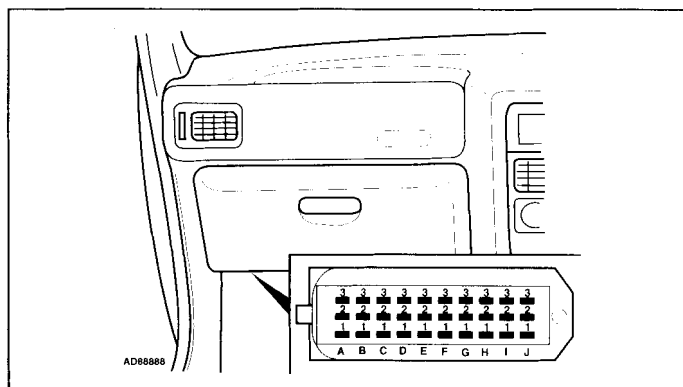
Model: Saxo 1,6  
 Year: 1996-98  
 Engine code: NFZ  
 System: Bosch Motronic MP5.1/5.2

**CITROEN**



Engine management

## Data link connector (DLC) locations



Under fascia, passenger's side

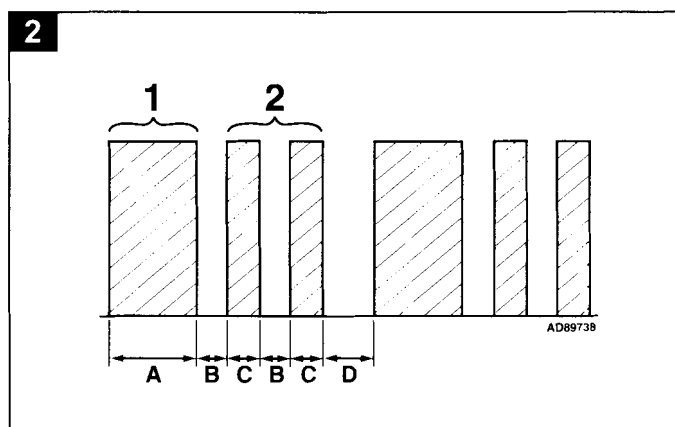
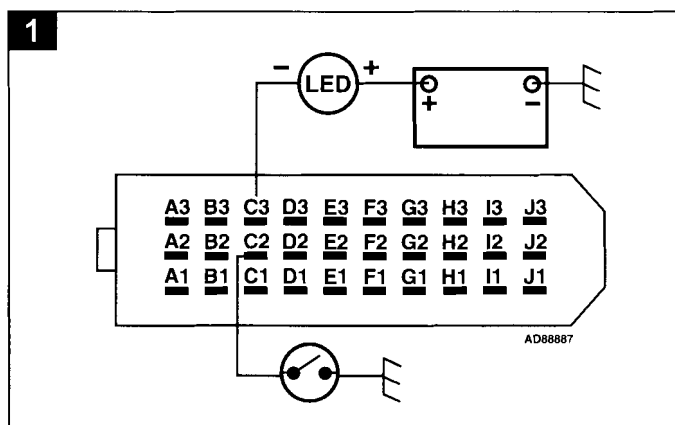
## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL) or LED.
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Vehicles fitted with a coded keypad: When switching on ignition or entering start code ensure diagnostic equipment is disconnected from the data link connector (DLC).

### Accessing

- Switch ignition ON.
- Check that MIL illuminates.
- Connect LED test lamp between data link connector (DLC) terminal C3 and battery positive **1**.
- Bridge data link connector (DLC) terminal C2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Each trouble code consists of one or two groups of one or more flashes **2**.
- Long flashes indicate the 'tens' of the trouble code **2** [A].
- Short flashes indicate the 'units' of the trouble code **2** [C].
- A short pause separates each flash **2** [B].
- A long pause separates each trouble code **2** [D].
- For example: Trouble code 12 displayed **2**.
- Repeat operation. Note trouble codes.
- Compare with trouble code table. Rectify faults as necessary.



**Erasing****Method 1**

- Switch ignition ON.
- Connect LED test lamp between data link connector (DLC) terminal C3 and battery positive **1**.
- Bridge data link connector (DLC) terminal C2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Repeat switch operation until code 11 is displayed.
- Operate switch for 10-20 seconds.
- Switch ignition OFF.

**Method 2**

- Ensure ignition switched OFF.
- Disconnect battery earth lead for 10 seconds.

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

**Trouble code identification**

Flash type	Fault location	Probable cause
1	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
2	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
3	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
4	Idle air control (IAC) valve	Wiring, IAC valve, ECM
5	Crankshaft position (CKP) sensor/ engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
6	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, hoses blocked/leaking, ECM
7	Injectors	Wiring, relay module, injectors, ECM
8	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S) – heater circuit, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, ECM
9	Heated oxygen sensor (HO2S)	Wiring, HO2S, exhaust leak, relay module, ECM
10	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
11	Battery voltage	Wiring, battery discharged, alternator
12	Engine control module (ECM)	Wiring, battery, ECM
13	Vehicle speed sensor (VSS)	Wiring, VSS, ECM



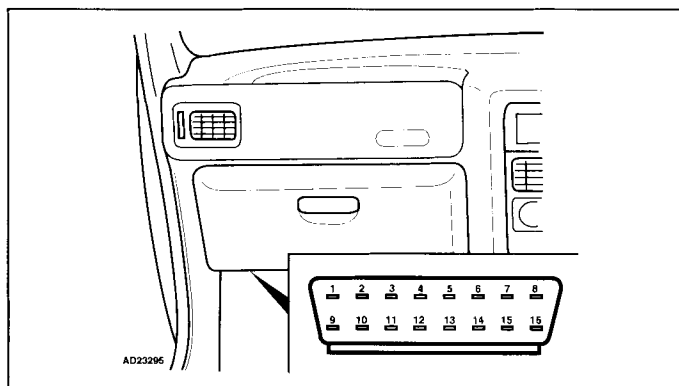
Model: Saxo 1,6 • Xsara 1,6/2,0  
 Year: 1997-00  
 Engine code: NFZ, RFV  
 System: Bosch MP5.1/5.2

**CITROEN**

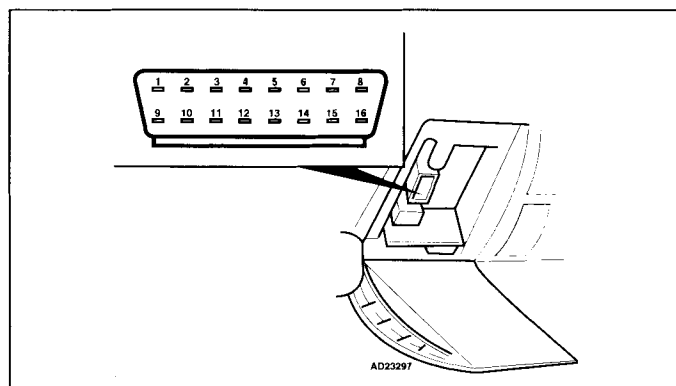


Engine management

## Data link connector (DLC) locations



Saxo – under fascia, passenger's side



Xsara – in fascia fusebox

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

Scanner type	Fault location	Probable cause
1	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
2	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
3	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
4	Idle air control (IAC) valve	Wiring, IAC valve, ECM
5	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
6	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, hoses blocked/leaking, ECM
7	Injectors	Wiring, relay module, injector(s), ECM
8	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S) – heater circuit, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, ECM
9	Heated oxygen sensor (HO2S)	Wiring, HO2S, exhaust leak, relay module, ECM
10	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
11	Battery voltage	Wiring, battery discharged, alternator
12	Engine control module (ECM)	Wiring, battery, ECM
13	Vehicle speed sensor (VSS)	Wiring, VSS, ECM



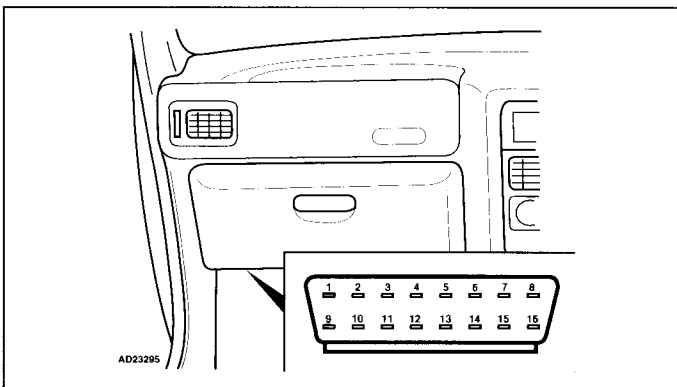


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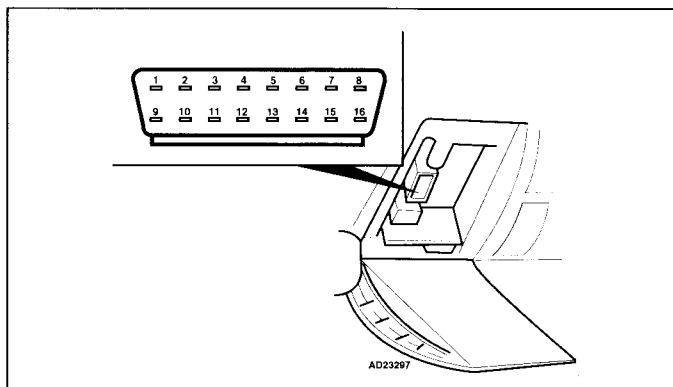
Model: Saxo 1,6 MT • Xsara 1,6 • Picasso 1,6  
Year: 1998-00  
Engine code: NFZ  
System: Bosch Motronic MP7.2

## Engine management

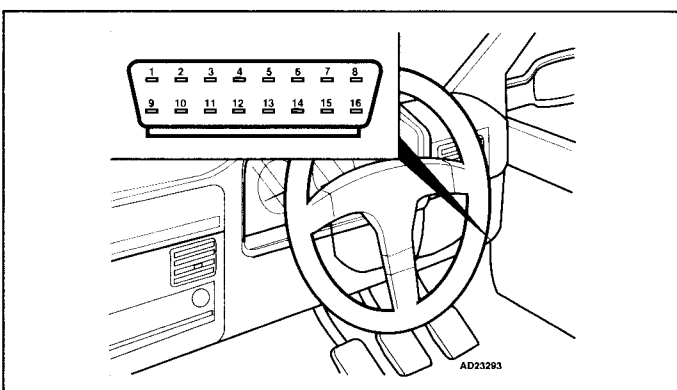
### Data link connector (DLC) locations



Saxo – under fascia, passenger's side



Xsara, Picasso – in fascia fusebox



Berlingo – under fascia, driver's side

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification**

Scanner type	Fault location	Probable cause
1	Battery voltage	Wiring, battery discharged, alternator
2	Crankshaft position (CKP) sensor/ engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
3	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
4	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, hoses blocked/leaking, ECM
5	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
6	Knock sensor (KS)	Wiring, KS, ECM
7	Heated oxygen sensor (HO2S)	Wiring, HO2S, exhaust leak, relay module, ECM
8	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
9	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
10	Relay module	Wiring, relay module – fuel pump contacts, ECM
11	Malfunction indicator lamp (MIL)	Wiring, MIL, ECM
12	Oxygen sensor heater	Wiring, oxygen sensor heater, relay module, ECM
13	Injectors	Wiring, relay module, injector(s), ECM
14	Ignition coil 1 – cylinders 1 & 4	Wiring, ignition coil, ECM
15	Ignition coil 2 – cylinders 2 & 3	Wiring, ignition coil, ECM
16	Idle air control (IAC) valve	Wiring, IAC valve, ECM
17	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
18	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, ignition system, ECM
19	Idle air control (IAC) valve – idle speed incorrect	Wiring, accelerator cable adjustment, hoses blocked/leaking, intake leak, IAC valve, ECM
20	Engine control module (ECM)	Wiring, battery, ECM
21	Engine control module (ECM) – ignition coil control	Wiring, ignition coil, relay module, ECM
22	Engine control module (ECM) – programming	Incorrect programming, ECM



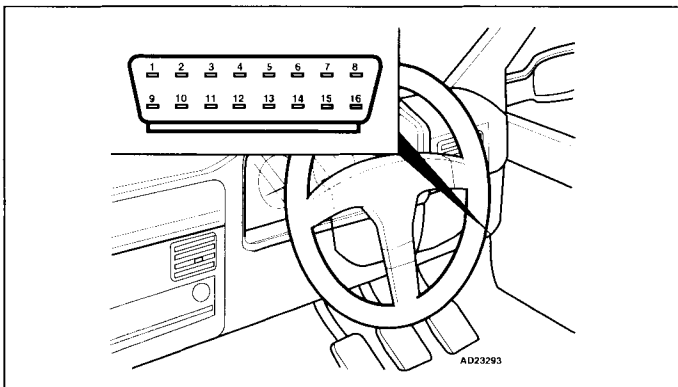


# CITROËN

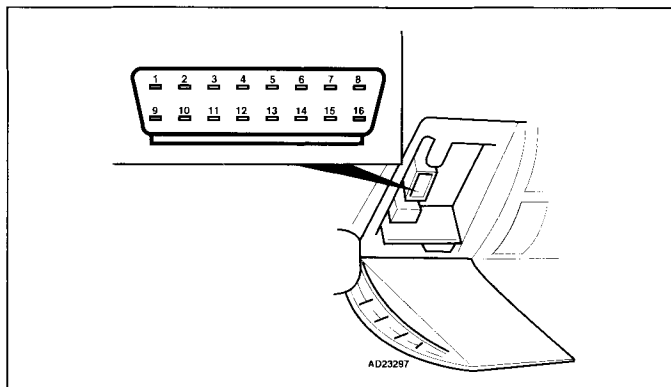
Model: C3 1,4 • Berlingo 1,4 • Picasso 1,8 • C5 1,8  
Year: 2002-04  
Engine code: KFV, KFW, 6FZ  
System: Sagem S2000 PM1

## Engine management

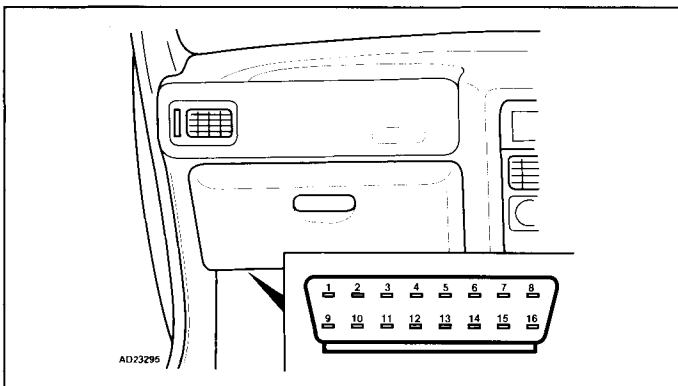
### Data link connector (DLC) locations



Berlingo



Picasso – in fascia fuse box



C3, C5

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1108	Manifold absolute pressure (MAP) sensor – circuit intermittent	Wiring, poor connection, MAP sensor, ECM
P1109	Manifold absolute pressure (MAP) sensor – circuit intermittent	Wiring, poor connection, MAP sensor, ECM
P1110	Manifold absolute pressure (MAP) sensor – circuit intermittent	Wiring, poor connection, MAP sensor, ECM



EOBD type	Fault location	Probable cause
P1100	Exhaust gas recirculation (EGR) system – range/performance problem	Wiring, EGR valve/solenoid, hose leak/blockage
P1111	Exhaust gas recirculation (EGR) – circuit malfunction	Wiring, EGR valve/solenoid
P1121	Engine control module (ECM) – processor fault	ECM
P1152	Throttle motor position sensor 1/2 – correlation	Wiring, throttle motor position sensor 1/2, accelerator pedal position (APP) sensor
P1157	Throttle motor position sensor 2 – signal	Wiring, throttle motor position sensor 2, throttle motor, mechanical fault
P1158	Throttle motor position sensor 2 – signal	Wiring, throttle motor position sensor 2, throttle motor, mechanical fault
P1186	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
P1280	Throttle motor position sensor 1/2 – position check	Wiring, throttle motor position sensor 1/2, throttle motor
P1327	Ignition coil, camshaft position (CMP) sensor – control circuit	Wiring, ignition coil, CMP sensor, ECM
P1511	Supply voltage	Wiring, alternator, battery discharged, multifunction control module
P1526	Alternator – circuit	Wiring, alternator, battery discharged, multifunction control module
P1536	Brake pedal position (BPP) switch – plausibility	Wiring, BPP switch, multifunction control module, mechanical fault
P1543	Air conditioning (AC) – request signal	Wiring, multifunction control module, AC refrigerant pressure sensor, AC control module
P1601	Relay module – control circuit	Wiring, relay module, multifunction control module
P1608	Engine hot lamp output – circuit malfunction	Wiring, engine hot lamp, ECM
P1621	Engine control module (ECM) – internal fault	ECM
P1626	Transmission control system – implausible signal	Wiring, transmission control module (TCM), multifunction control module, mechanical fault
P1631	Engine control module (ECM) – processor fault	ECM
P1794	Electronic stability programme (ESP), ABS control system – no communication	Wiring, electronic stability program (ESP) control module, ABS control module, multifunction control module
U1000	Controller area network (CAN) data bus, ECM – no communication	Wiring, CAN data bus
U1003	Controller area network (CAN) data bus – no communication	Wiring, CAN data bus
U1109	Controller area network (CAN) data bus, transmission control system – no communication	Wiring, CAN data bus, transmission control module (TCM), multifunction control module
U1117	Controller area network (CAN) data bus, suspension – no communication	Wiring, electronic stability program (ESP) control module, CAN data bus
U1118	Controller area network (CAN) data bus, multifunction control module – no communication	Wiring, multifunction control module, CAN data bus

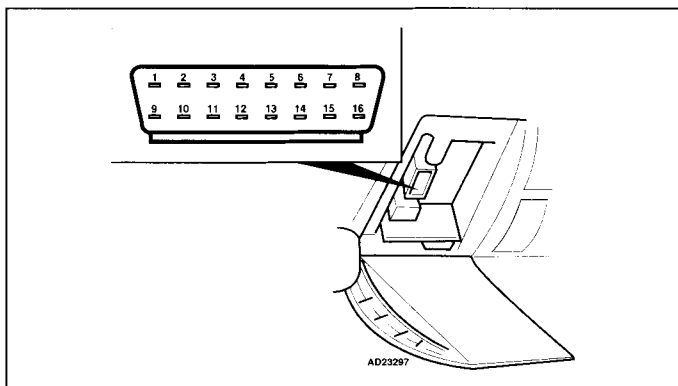


**CITROEN**

Model: Xsara 1,8  
Year: 1997-00  
Engine code: LFZ  
System: Magneti Marelli 08P1A/8P10

## Engine management

### Data link connector (DLC) locations



In fascia fusebox

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

Scanner type	Fault location	Probable cause
11	End of sequence	—
12	Start of sequence	—
13	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
14	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
15	Relay module	Wiring, relay module – fuel pump contacts, ECM
21	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
22	Idle air control (IAC) valve	Wiring, IAC valve, ECM
31	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
33	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, hoses blocked/leaking, ECM
34	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM





Scanner type	Fault location	Probable cause
41	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
42	Injectors	Wiring, relay module, injector(s), ECM
45	Ignition coil 1 – cylinders 1 & 4	Wiring, ignition coil, ECM
52	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
53	Battery voltage	Wiring, battery discharged, alternator
54	Engine control module (ECM)	Wiring, battery, ECM
57	Ignition coil 2 – cylinders 2 & 3	Wiring, ignition coil, ECM



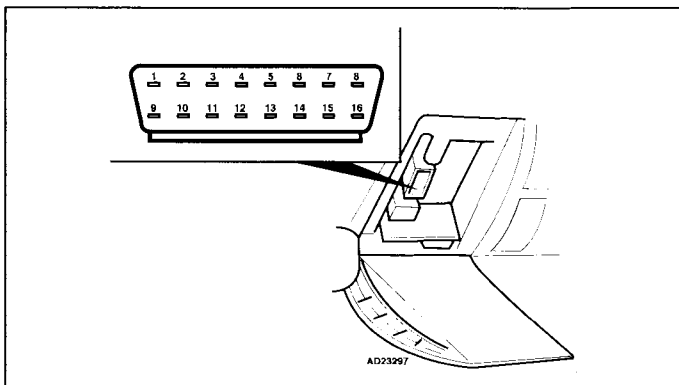


# CITROEN

Model: Xsara 2,0  
Year: 1997-00  
Engine code: RFS  
System: Magneti Marelli 1AP10

## Engine management

### Data link connector (DLC) locations



In fascia fusebox

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

Scanner type	Fault location	Probable cause
1	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
2	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
3	Relay module	Wiring, relay module – fuel pump contacts, ECM
4	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
5	Idle air control (IAC) valve	Wiring, IAC valve, ECM
6	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
7	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S) – heater circuit, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, ECM
8	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, hoses blocked/leaking, ECM
9	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM



Scanner type	Fault location	Probable cause
10	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
11	Camshaft position (CMP) sensor	Wiring, CMP sensor, ECM
12	Injectors	Wiring, relay module, injector(s), ECM
13	Ignition coils	Wiring, ignition coil(s), ECM
14	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S), intake/exhaust leak, fuel pressure, injector control, EVAP canister purge valve, ignition system, ECM
15	Battery voltage	Wiring, battery discharged, alternator
16	Engine control module (ECM)	Wiring, battery, ECM
17	Heated oxygen sensor (HO2S)	Wiring, HO2S, exhaust leak, relay module, ECM
18	Knock control	Wiring, KS, mechanical fault, incorrect fuel, ignition system, ECM
19	Knock sensor (KS)	Wiring, KS, ECM
20	Power steering pressure (PSP) sensor/switch	Wiring, PSP switch/sensor, power steering pump, power steering system pressure, ECM



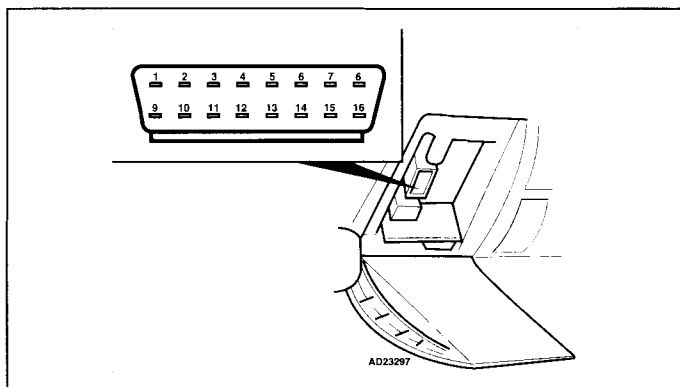


# CITROËN

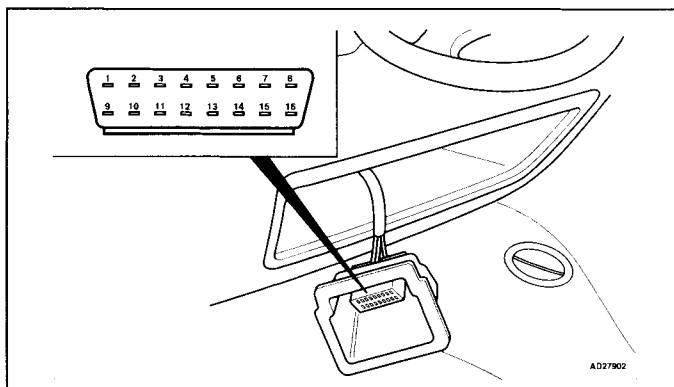
Model: Xsara 2,0 • Picasso 2,0 • C5 2,0/2,2 • C8 2,0/2,2  
Year: 2002-04  
Engine code: RFN, RFM, 3FZ  
System: Magneti Marelli 6LP1.03/1.04/1.05/1.06/1.08/1.23/3.07  
Magneti Marelli 4MP2.03/2.04/2.05/2.18

## Engine management

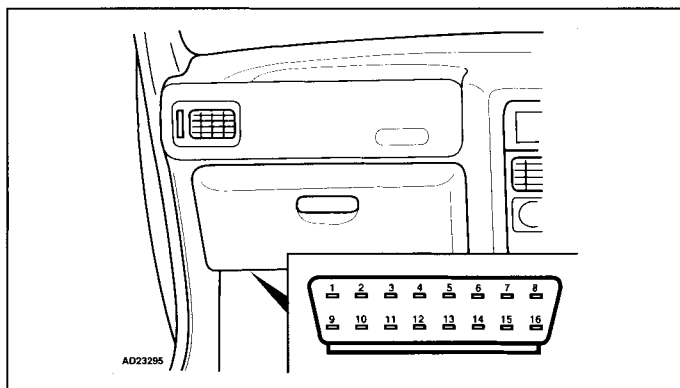
### Data link connector (DLC) locations



Xsara, Picasso – in fascia fuse box



C8 – fascia, driver's side



C5

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P0	Refer to EOBD trouble code table	–
P1110	Air conditioning (AC) – request signal	Wiring, multifunction control module, AC refrigerant pressure sensor
P1112	Throttle motor position sensor 1/2 – position check	Wiring, throttle motor position sensor 1/2, throttle motor
P1133	Throttle motor position sensor 1, manifold absolute pressure (MAP) sensor – correlation	Wiring, throttle motor position sensor 1, MAP sensor, throttle motor, mechanical fault
P1134	Throttle motor position sensor 2, manifold absolute pressure (MAP) sensor – correlation	Wiring, throttle motor position sensor 2, throttle motor, mechanical fault
P1135	Intake manifold	–
P1147	Camshaft position (CMP) actuator	Wiring, camshaft position (CMP) actuator, mechanical fault
P1148	Camshaft position (CMP) actuator	Wiring, camshaft position (CMP) actuator, mechanical fault
P1149	Camshaft position (CMP) actuator	Wiring, camshaft position (CMP) actuator, mechanical fault
P1150	Throttle motor – control	Wiring, throttle motor, throttle motor position sensor 1/2, accelerator pedal position (APP) sensor
P1151	Throttle motor – control	Wiring, throttle motor, throttle motor position sensor 1/2, accelerator pedal position (APP) sensor
P1152	Throttle motor position sensor 1/2 – correlation	Wiring, throttle motor position sensor 1/2, accelerator pedal position (APP) sensor
P1153	Throttle motor position sensor 1/2 – initialization of butterfly stops	Wiring, throttle motor position sensor 1/2, mechanical fault, throttle motor
P1154	Throttle motor – control	Wiring, throttle motor, throttle motor position sensor 1/2, accelerator pedal position (APP) sensor
P1155	Throttle motor – control	Wiring, throttle motor, throttle motor position sensor 1/2, accelerator pedal position (APP) sensor
P1156	Throttle motor position sensor 1 – signal	Wiring, throttle motor position sensor 1, throttle motor, mechanical fault
P1157	Throttle motor position sensor 1 – signal	Wiring, throttle motor position sensor 1, throttle motor, mechanical fault
P1158	Throttle motor position sensor 1 – signal	Wiring, throttle motor position sensor 1, throttle motor, mechanical fault
P1160	Intake manifold	–
P1454	Exhaust gas recirculation (EGR) system – range/performance problem	Wiring, hose leak/blockage, EGR valve/solenoid
P1461	Exhaust gas recirculation (EGR) valve position sensor – initialization	Wiring, EGR valve position sensor, mechanical fault
P1462	Exhaust gas recirculation (EGR) valve position sensor – initialization	Wiring, EGR valve position sensor, mechanical fault
P1507	Engine coolant blower motor, rationality check – malfunction	Wiring, engine coolant blower motor, ECM
P1517	Immobilizer – programming	Incorrect programming, immobilizer transponder, multifunction control module, combination switch
P1519	Engine coolant blower motor, power/earth – circuit malfunction	Wiring, engine coolant blower motor, ECM
P1543	Air conditioning (AC) – request signal	Wiring, multifunction control module, AC refrigerant pressure sensor



**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1555	Exhaust gas recirculation (EGR) system – range/performance problem	Wiring, hose leak/blockage, EGR valve/solenoid
P1603	Engine coolant temperature (ECT) sensor – range/performance problem	Wiring, ECT sensor, multifunction control module
P1608	Engine hot lamp output – circuit malfunction	Wiring, engine hot lamp, ECM
P1610	Fuel consumption signal	Wiring, trip computer, ECM
P1612	Immobilizer – memorization	Incorrect programming, immobilizer transponder, multifunction control module
P1614	Engine control module (ECM) – sensor supply	Wiring, ECM
P1617	Engine control module (ECM) – processor fault	ECM
P1621	Engine control module (ECM) – internal fault	ECM
P1622	Throttle motor position sensor/manifold absolute pressure (MAP) sensor – correlation	Wiring, throttle motor position sensor 1, MAP sensor, throttle motor, mechanical fault
P1623	Engine torque delivered	–
P1624	Electronic stability programme (ESP) – incorrect signal	Wiring, electronic stability program (ESP) control module, multifunction control module
P1625	Electronic stability programme (ESP) – incorrect signal	Wiring, electronic stability program (ESP) control module, multifunction control module
P1626	Transmission control system – implausible signal	Wiring, transmission control module (TCM), multifunction control module, mechanical fault
P1627	Non respect of torque demanded by driver	–
P1628	Brake pedal position (BPP) switch, accelerator pedal position (APP) sensor – correlation	Wiring, BPP switch, APP sensor, multifunction control module, mechanical fault
P1629	Calculated mechanical friction/actual friction – correlation	–
P1630	Cruise control system – implausible signal	Wiring, combination switch, multifunction control module
P1631	Engine control module (ECM) – processor fault	ECM
U1000	Controller area network (CAN) data bus, ECM – no communication	Wiring, CAN data bus
U1003	Controller area network (CAN) data bus – no communication	Wiring, CAN data bus
U1109	Controller area network (CAN) data bus, transmission control module (TCM) – no communication	Wiring, CAN data bus
U1113	Controller area network (CAN) data bus, ECM/ESP – no communication	Wiring, CAN data bus
U1117	Controller area network (CAN) data bus, suspension – no communication	Wiring, CAN data bus
U1118	Controller area network (CAN) data bus, multifunction control module – no communication	Wiring, CAN data bus
U1209	Controller area network (CAN) data bus, transmission control module (TCM) – no communication	Wiring, CAN data bus
U1213	Controller area network (CAN) data bus, ECM/ESP – no communication	Wiring, CAN data bus
U1217	Controller area network (CAN) data bus, suspension – no communication	Wiring, CAN data bus
U1218	Controller area network (CAN) data bus, multifunction control module – no communication	Wiring, CAN data bus



Model: Xsara 2,0 HDi • Xantia 2,0 HDi • Picasso 2,0 HDi  
Synergie/Evasion 2,0 HDi • Berlingo 2,0 HDi  
Jumpy/Dispatch 2,0 HDi

Year: 1998-04

Engine code: DW10TD/DW10ATD (RHY), DW10ATED (RHZ),  
DW10BTED/L3 (RHX)

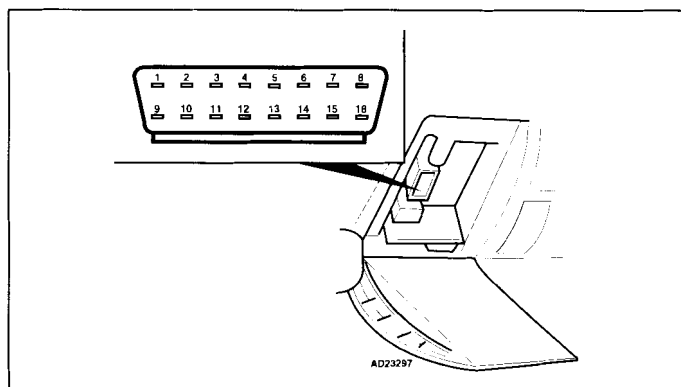
System: Bosch EDC 15C2 • Bosch EDC 15 CP1/C2

**CITROEN**

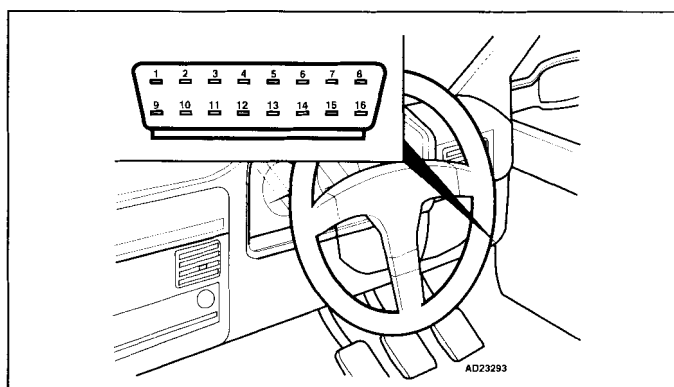


Engine management

## Data link connector (DLC) locations



Xsara, Xantia, Picasso – in fascia fusebox



Synergie/Evasion, Berlingo – under fascia, driver's side

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1101	Barometric pressure (BARO) sensor	Incorrectly programmed ECM, EEPROM error, ECM
P1108	Engine coolant blower motor relay 1 – operation	Wiring, blower motor relay 1
P1109	Engine coolant blower motor relay 2 – operation	Wiring, blower motor relay 2
P1110	Air conditioning	Wiring, AC temperature sensors control module, AC control module, multifunction control module, ECM
P1112	Fuel pressure – control	Wiring, fuel system pressure sensor, fuel pressure control solenoid, fuel system, ECM
P1135	3rd piston cut-off solenoid	Wiring, 3rd piston cut-off solenoid, ECM
P1138	Fuel pressure control solenoid	Wiring, fuel pressure control solenoid, ECM
P1169	Engine control module (ECM) – injector control – capacitor 1	Wiring, ECM

**CITROEN**Model: Xsara 2,0 HDi • Xantia 2,0 HDi • Picasso 2,0 HDi • Synergie/  
Evasion 2,0 HDi • Berlingo 2,0 HDi • Jumpy/Dispatch 2,0 HDi**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1170	Engine control module (ECM) – injector control – capacitor 2	Wiring, ECM
P1171	Engine control module (ECM) – extended engine stop	Wiring, relay module, ECM
P1402	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid, ECM
P1403	Engine coolant heater	Wiring, engine coolant heater relay, ECM
P1404	Engine control module (ECM) – glow plug control module/engine coolant heater relay – control	Wiring, glow plug control module, engine coolant heater relay, ECM
P1408	Engine coolant heater – control	Wiring, incorrectly programmed ECM, battery, EEPROM error
P1511	Engine control module (ECM) – supply voltage	Wiring, battery, ignition switch, ECM
P1517	Alarm system/central locking control module – programming	Wiring, incorrectly programmed
P1519	Engine control module (ECM) – engine coolant blower motor control	Wiring, engine coolant blower motor relay, ECM
P1521	Clutch pedal position (CPP) switch	Wiring, CPP switch, VSS, ECM
P1606	Malfunction indicator lamp (MIL)	Wiring, MIL, ECM
P1614	Engine control module (ECM) – sensor reference voltage incorrect	Wiring, ECM
P1614	Engine control module (ECM) – CMP sensor reference voltage incorrect	Wiring, ECM





Model: Xantia 1,6/1,8 • Xantia 2,0/Turbo • XM 2,0/3,0  
Synergie/Evasion 2,0/Turbo

Year: 1993-00

Engine code: BFZ, LFY, LFZ, RFT, RFU, RFV, RFX, RFY, RGX,  
UFY, UFZ, UKZ

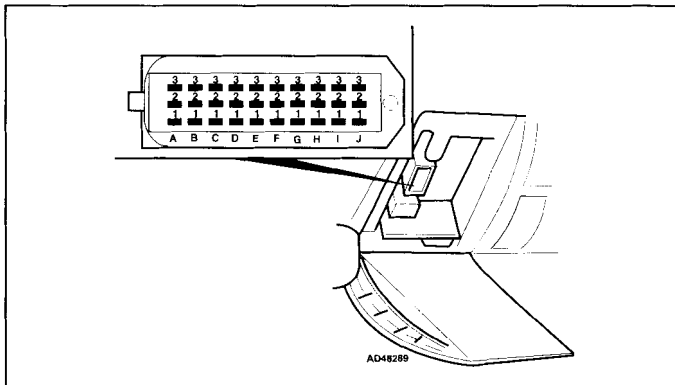
System: Magneti Marelli 8P.10/13/20/22  
Bosch Motronic MP3.2/5.1/5.1.1 • Fenix 3B/4

**CITROEN**

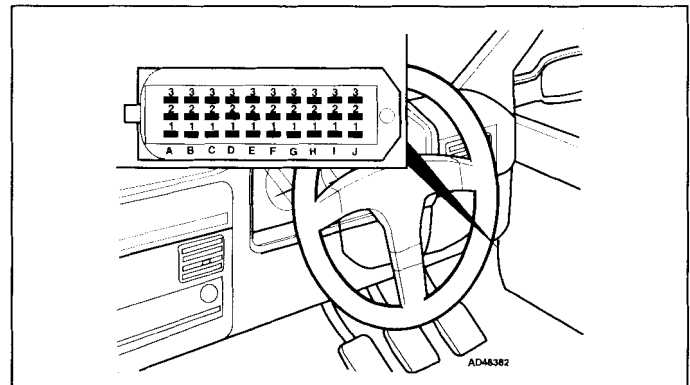


Engine management

## Data link connector (DLC) locations



XM, Xantia – in fascia fusebox



Synergie/Evasion – under fascia, driver's side

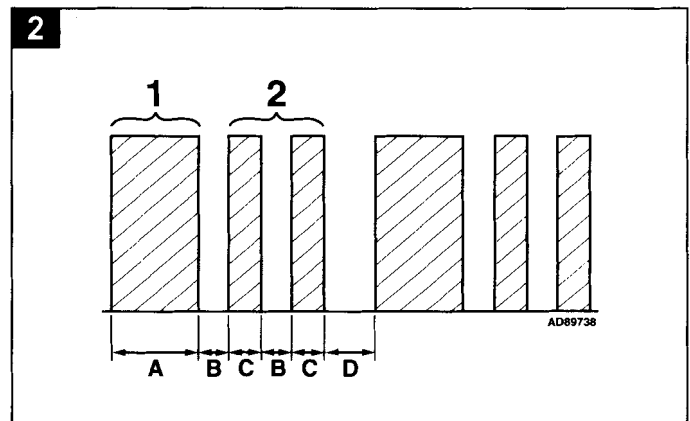
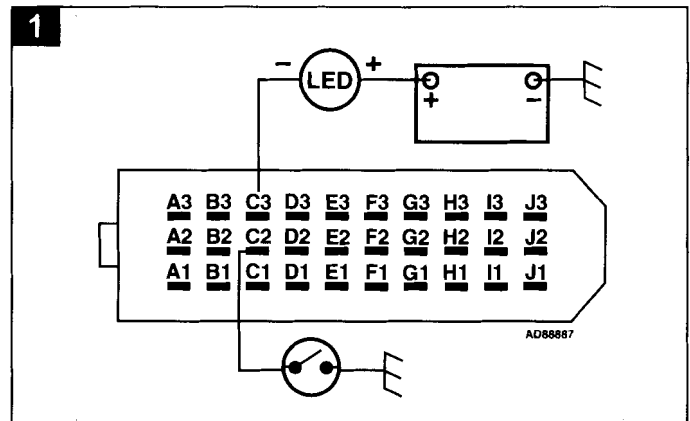
## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL) or LED.
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Vehicles fitted with a coded keypad: When switching on ignition or entering start code ensure diagnostic equipment is disconnected from the data link connector (DLC).

### Accessing

- Switch ignition ON.
- Check that MIL illuminates.
- Connect LED test lamp between data link connector (DLC) terminal C3 and battery positive **1**.
- Bridge data link connector (DLC) terminal C2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Each trouble code consists of two groups of one or more flashes **2**.
- Long flashes indicate the 'tens' of the trouble code **2** [A].
- Short flashes indicate the 'units' of the trouble code **2** [C].
- A short pause separates each flash **2** [B].
- A long pause separates each trouble code **2** [D].
- For example: Trouble code 12 displayed **2**.
- Repeat operation. Note trouble codes.
- Compare with trouble code table. Rectify faults as necessary.





## Engine management

### Erasing

#### Method 1

- Switch ignition ON.
- Connect LED test lamp between data link connector (DLC) terminal C3 and battery positive **1**.
- Bridge data link connector (DLC) terminal C2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Repeat switch operation until code 11 is displayed.
- Operate switch for 10-20 seconds.
- Switch ignition OFF.

#### Method 2

- Ensure ignition switched OFF.
- Disconnect battery earth lead for 10 seconds.

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

### Trouble code identification

Flash type	Fault location	Probable cause
11	End of sequence	–
12	Start of sequence	–
13	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
14	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
15	Relay module/fuel pump relay	Wiring, fuel pump relay, relay module – fuel pump contacts, ECM
21	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
22	Idle air control (IAC) valve/idle speed control (ISC) actuator	Wiring, IAC valve/ISC actuator, ECM
23	Idle air control (IAC) valve – idle speed incorrect	Wiring, accelerator cable adjustment, hoses blocked/leaking, fuel pump relay, IAC valve, ECM
25	Intake manifold air control solenoid 1	Wiring, intake manifold air control solenoid, ECM
26	Intake manifold air control solenoid 2	Wiring, intake manifold air control solenoid, ECM
27	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
31 <b>1</b>	Mixture control (MC), bank 1	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
31 <b>2</b>	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
32	Mixture control (MC), bank 2	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
33	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, hoses blocked/leaking, ECM
34	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
36	Oxygen sensor heater relay	Wiring, oxygen sensor heater relay, ECM
41	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM



Flash type	Fault location	Probable cause
42	Injectors	Wiring, relay module, injectors, ECM
43	Knock control	Wiring, KS, mechanical fault, incorrect fuel, ignition system, ECM
44	Knock sensor (KS) 1	Wiring, KS, ECM
45	Ignition coil 1 – cylinders 1 & 4	Wiring, ignition coil, ECM
46	Turbocharger (TC) wastegate regulating valve	Wiring, hoses blocked/leaking, TC wastegate regulating valve, ECM
47	Turbocharger (TC) wastegate regulation	TC wastegate regulating valve, MAP sensor, TP sensor, exhaust leak, intake leak
51	Heated oxygen sensor (HO2S) 1	Wiring, HO2S, exhaust leak, relay module, oxygen sensor heater relay, ECM
52 ■	Mixture control (MC), bank 1	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
52 ■	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
53	Battery voltage	Wiring, battery discharged, alternator
54	Engine control module (ECM)	Wiring, battery, ECM
56	Coded keypad	Wiring, coded keypad, ECM
57	Ignition coil 2 – cylinders 2 & 3	Wiring, ignition coil, ECM
62	Knock sensor (KS) 2	Wiring, KS, ECM
63	Heated oxygen sensor (HO2S) 2	Wiring, HO2S, exhaust leak, relay module, oxygen sensor heater relay, ECM
64	Mixture control (MC), bank 2	Wiring, incorrect fuel, HO2S, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
65	Camshaft position (CMP) sensor	Wiring, CMP sensor, ECM
71	Injector 1	Wiring, relay module, injector, ECM
72	Injector 2	Wiring, relay module, injector, ECM
73	Injector 3	Wiring, relay module, injector, ECM
74	Injector 4	Wiring, relay module, injector, ECM
75	Injector 5	Wiring, relay module, injector, ECM
76	Injector 6	Wiring, relay module, injector, ECM

- 1 Fenix 4  
2 Fenix 3B



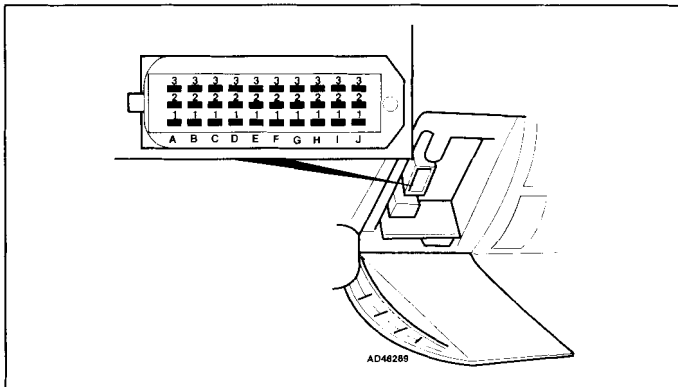


# CITROEN

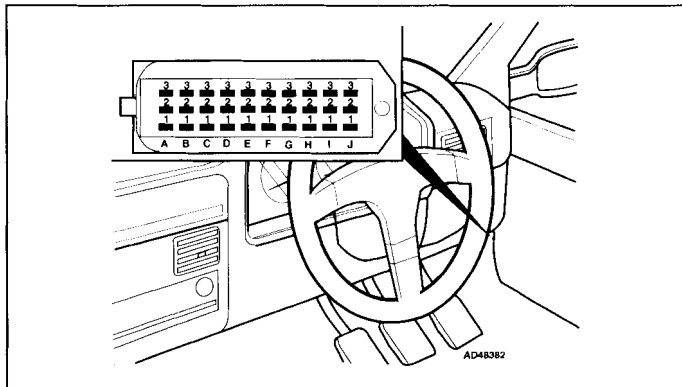
Model: Xantia 1,9D Turbo • Synergie/Evasion 1,9D Turbo  
 Year: 1995-98  
 Engine code: XUD9BTF/L3 (DHX)  
 System: Bosch AS3

## Engine management

### Data link connector (DLC) locations



Xantia – in fascia fusebox



Synergie/Evasion – under fascia, driver's side

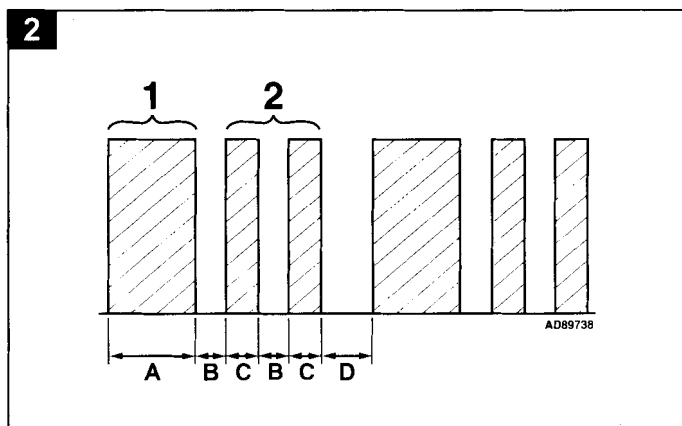
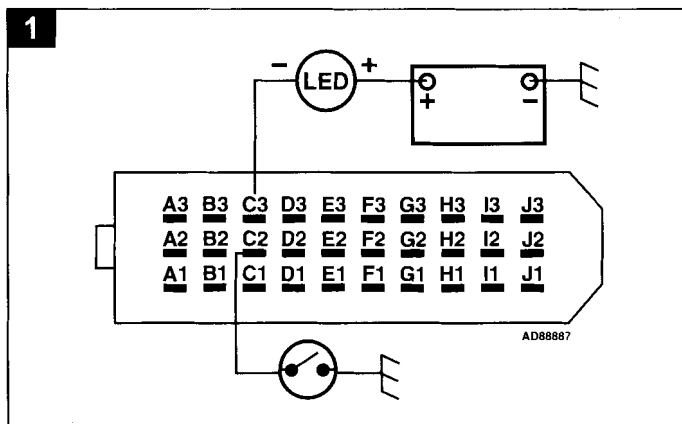
### Trouble codes

#### General information



- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL) or LED.
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Vehicles fitted with a coded keypad: When switching on ignition or entering start code ensure diagnostic equipment is disconnected from the data link connector (DLC).

#### Accessing

- Switch ignition ON.
- Check that MIL illuminates.
- Connect LED test lamp between data link connector (DLC) terminal C3 and battery positive **1**.
- Bridge data link connector (DLC) terminal C2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Each trouble code consists of two groups of one or more flashes **2**.
- Long flashes indicate the 'tens' of the trouble code **2** [A].
- Short flashes indicate the 'units' of the trouble code **2** [C].
- A short pause separates each flash **2** [B].
- A long pause separates each trouble code **2** [D].
- For example: Trouble code 12 displayed **2**.
- Repeat operation. Note trouble codes.
- Compare with trouble code table.
- Rectify faults as necessary.



**Erasing****Method 1**

- Switch ignition ON.
- Connect LED test lamp between data link connector (DLC) terminal C3 and battery positive .
- Bridge data link connector (DLC) terminal C2 and earth with a switched lead – contacts normally open .
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Repeat switch operation until code 11 is displayed.
- Operate switch for 10-20 seconds.
- Switch ignition OFF.

**Method 2**

- Ensure ignition switched OFF.
- Disconnect battery earth lead for 10 seconds.

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

**Trouble code identification**

Flash type	Fault location	Probable cause
14	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
16	Exhaust gas recirculation (EGR) solenoid	Wiring, relay module, EGR solenoid
21	Fuel lever position sensor	Wiring, fuel lever position sensor
39	Malfunction indicator lamp (MIL)	Wiring, MIL, ECM
41	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
46	Fuel injection pump – timing control	Fuel injection pump timing
49	Fuel injection timing solenoid	Wiring, fuel injection timing solenoid
53	Battery voltage	Wiring, battery discharged, alternator
54	Engine control module (ECM)	Wiring, battery, ECM
57	Barometric pressure (BARO) sensor	ECM
58	Glow plug control module – pre-heat	Wiring, glow plug(s), glow plug control module
65	Injector needle lift sensor	Wiring, fuel system, injector, injector needle lift sensor
66	Glow plug control module – pre-/post-heat	Wiring, glow plug control module
67	Glow plug warning lamp	Wiring, glow plug warning lamp, ECM
68	Idle speed control (ISC) actuator	Wiring, hoses blocked/leaking, ISC actuator



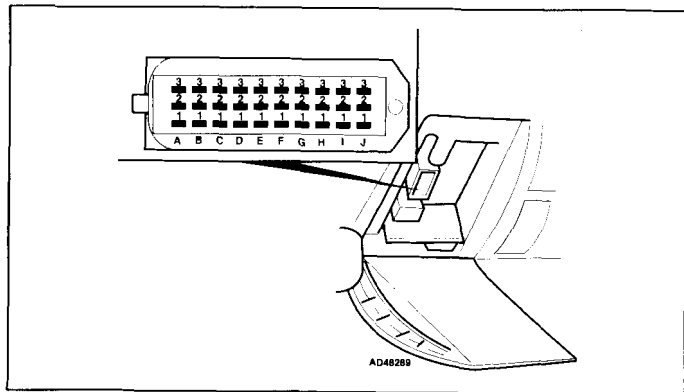


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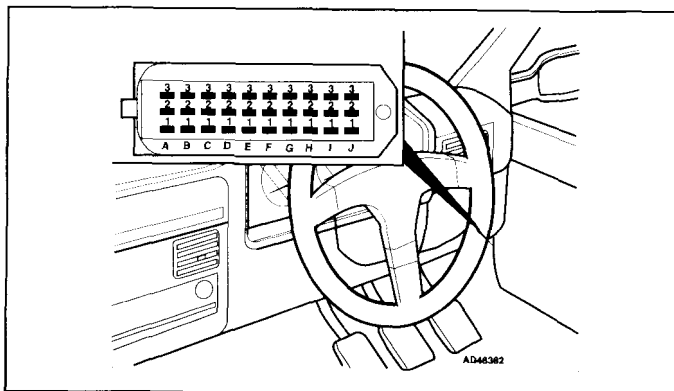
Model: Xantia 2,1D Turbo • XM 2,1D Turbo  
 Synergie/Evasion 2,1 TD • Dispatch/Jumpy  
 Year: 1995-00  
 Engine code: P8C  
 System: Lucas EPIC

Engine management

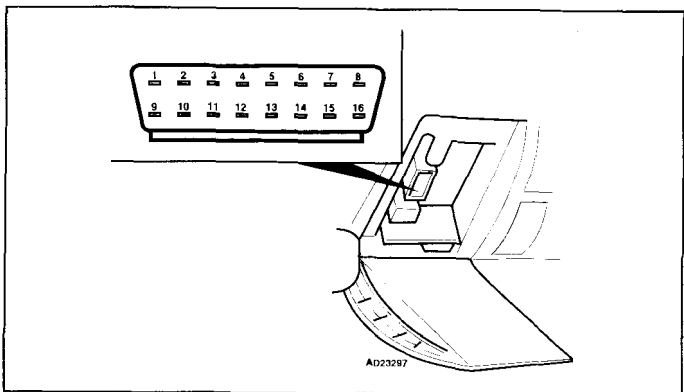
## Data link connector (DLC) locations



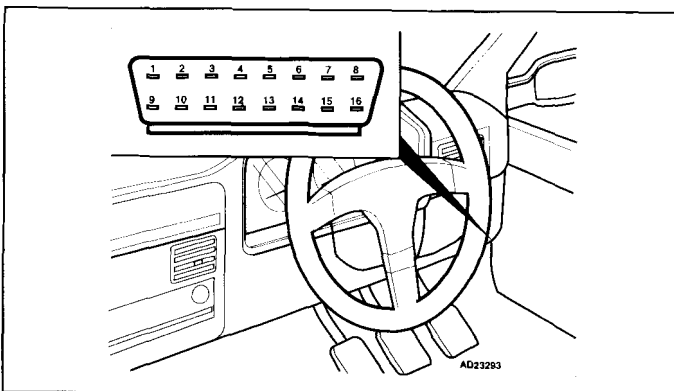
XM, Xantia →1998 – in fascia fusebox



Synergie/Evasion, Dispatch/Jumpy →1998



XM, Xantia 1998→ – in fascia fusebox



Synergie/Evasion, Dispatch/Jumpy 1998→

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Vehicles fitted with a coded keypad: When switching on ignition or entering start code ensure diagnostic equipment is disconnected from the data link connector (DLC).

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).
- The following scanner codes are applicable to the fuel system manufacturer's test equipment, similar and more detailed fault diagnosis information can be obtained using the vehicle manufacturer's or equivalent test equipment.



### Trouble code identification

Scanner type	Fault location	Probable cause
100	Engine control module (ECM) – memory	ECM
101	Engine control module (ECM) – low voltage during starting	Battery, relay module, wiring, ECM
102	Engine control module (ECM) – non-volatile memory fault	ECM
104	Engine control module (ECM) – analogue/digital converter	Wiring, ECM
105	Engine control module (ECM) – sensor reference voltage incorrect	Wiring, ECM
130	Engine control module (ECM) – memory locked	Coded keypad, ECM
150	Battery voltage	Wiring, IFS switch, relay module, battery, alternator, ECM
151	Battery voltage	Wiring, IFS switch, relay module, battery discharged, alternator
152	Relay module	Wiring, relay module, ECM
200	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
210	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
211	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
220	Fuel temperature sensor	Wiring, fuel temperature sensor, ECM
240	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
250	Crankshaft position (CKP) sensor	Wiring, CKP sensor, air gap, ECM
290	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
291	Accelerator pedal position (APP) sensor/brake pedal position (BPP) switch – signal conflict	Wiring, APP sensor, BPP switch, brake pedal applied whilst throttle fully depressed, accelerator pedal tight/sticking, ECM
300	Brake pedal position (BPP) switch	Wiring, BPP switch, ECM
320	Cruise control	Wiring, cruise control master switch, ECM
329	Transmission range (TR) switch	Wiring, TR switch
340	Air conditioning	Wiring, AC compressor clutch relay, AC control module, ECM
350	Glow plug control module – pre-/post-heat control	Wiring, glow plug control module, ECM
361	Tachometer signal	Wiring, tachometer, ECM
363	Fuel consumption signal	Wiring, trip computer, ECM
600	Fuel injection pump – rotor position monitoring	Wiring, fuel system, fuel quantity adjuster, fuel injection pump, relay module, ECM
601	Fuel injection pump – rotor position	Wiring, shield wiring, injection pump cam ring position sensor, injection pump rotor position sensor, fuel injection pump, ECM
602	Fuel injection pump – rotor calibration	Wiring, fuel injection pump, ECM
603	Fuel injection pump – rotor minimum calibration	Fuel injection pump
604	Fuel delivery/needle lift signal	Wiring, fuel injection pump, ECM



**CITROEN**Model: Xantia 2,1D Turbo • XM 2,1D Turbo • Synergie/Evasion 2,1 TD  
Dispatch/Jumpy**Engine management**

Scanner type	Fault location	Probable cause
605	Fuel injection pump – delivery calibration	Wiring, injection pump calibration resistor, fuel injection pump, ECM
650	Fuel shut-off solenoid	Wiring, relay module, coded keypad, fuel shut-off solenoid, fuel injection pump, ECM
700	Fuel injection pump – cam position monitoring	Wiring, fuel injection timing solenoid, fuel injection pump, relay module, ECM
701	Fuel injection pump – cam ring position sensor	Wiring, injection pump cam ring position sensor, fuel temperature sensor, fuel injection pump, ECM
702	Fuel injection pump – cam ring calibration	Wiring, fuel injection pump, ECM
703	Fuel injection pump – timing control	Fuel injection pump timing, CKP sensor
750	Injector needle lift sensor – no signal	Wiring, injector needle lift sensor, fuel system, injector, ECM
751	Injector needle lift sensor – incorrect signal	Wiring, injector needle lift sensor, fuel system, injector, ECM
803	Exhaust gas recirculation (EGR) solenoid – incorrect signal	Wiring, relay module, EGR solenoid, ECM







Model: Cinquecento 900/1,1 • Seicento 900/1,1 • Panda 900/1,1 • Punto 1,1/1,2/16V • Tipo/Tempra 1,8/2,0  
Brava/Bravo 1,6 • Marea/Marea Weekend 1,6 • Coupe 2,0 16V/Turbo

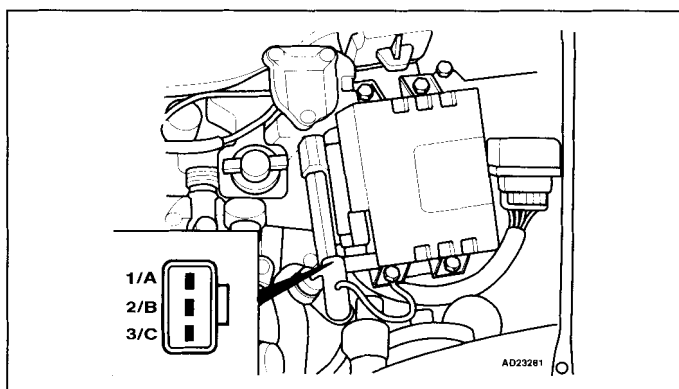
Year: 1989-03

Engine code: 1170A1.046, 1170A1046, 156C.046, 159A4.000, 159A4.046, 159A5.046, 159A6.046, 160A5.000, 160A8.046, 170A1.000, 170A1.046, 175A1/4.000, 176A6.000, 176A7.000, 176A8.000, 176B1.000, 176B2.000, 176B4.000, 176B9.000, 182A4.000, 182A6.000, 835C2.000, 835C4.000, 836A3.000, 836A5.000

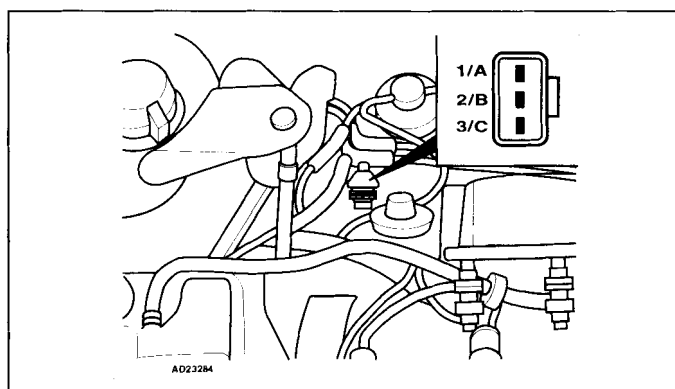
System: Weber-Marelli

## Engine management

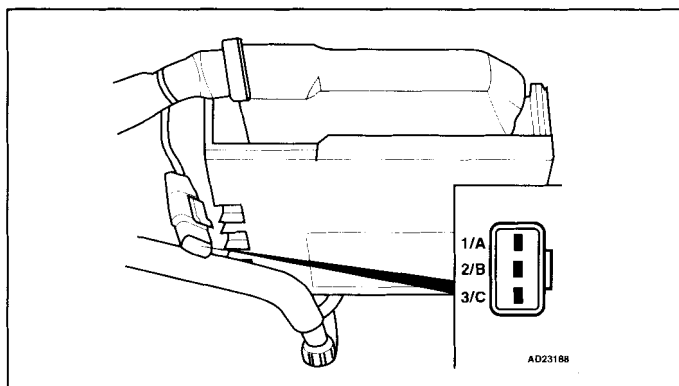
### Data link connector (DLC) locations



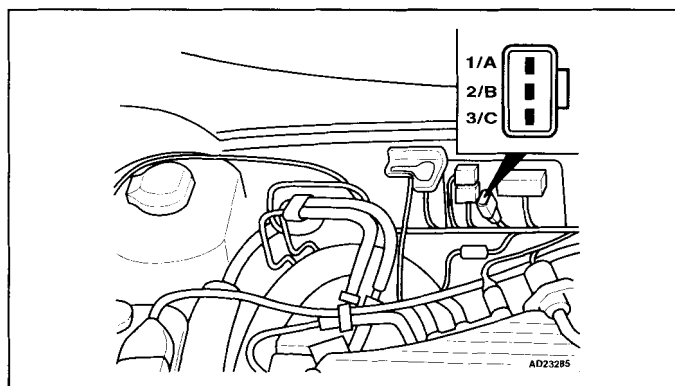
Cinquecento/Seicento – LH engine bay



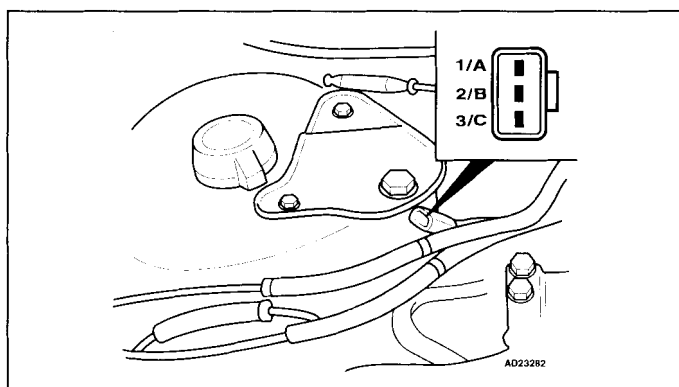
Tipo/Tempra – engine bay, rear



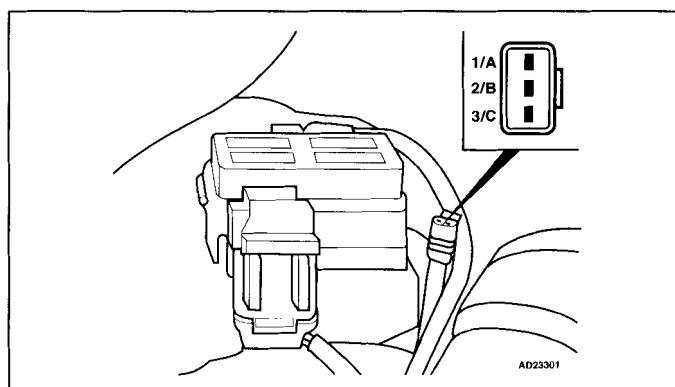
Panda – under fascia, passenger's side



Brava/Bravo/Marea/Marea Weekend 1,6 →1998 – engine bay rear



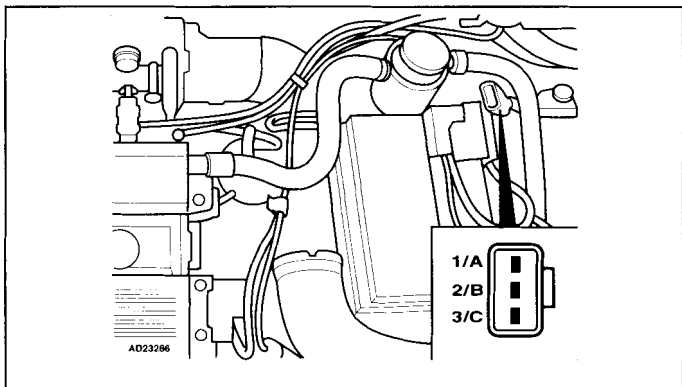
Coupe 2,0 16V/Punto – RH engine bay



Brava/Bravo/Marea/Marea Weekend 1,6 1998→ – LH engine bay

**FIAT**

Model:

Cinquecento 900/1,1 • Seicento 900/1,1 • Panda 900/1,1  
Punto 1,1/1,2/16V • Tipo/Tempra 1,8/2,0 • Brava/Bravo 1,6  
Marea/Marea Weekend 1,6 • Coupe 2,0 16V/Turbo**Engine management**

Coupe 2,0 16V Turbo – LH engine bay

**Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- No digital trouble codes available from vehicle manufacturer.

**Accessing and erasing**

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description, connected to the data link connector (DLC).

**Trouble code identification**

Fault location	Probable cause
AC signal	Wiring, AC system, AC control module
Air conditioning relay – circuit malfunction	Wiring, supply voltage, AC system
Camshaft position (CMP) sensor – circuit malfunction	Wiring, air gap, CMP sensor, insecure sensor/rotor, ECM
Crankshaft position (CKP) sensor/engine speed (RPM) sensor – malfunction	Wiring, CKP/RPM sensor, air gap, damaged sensor/rotor, ECM
Engine control module (ECM) – adaptive tolerance reached	Mechanical fault
Engine control module (ECM) – defective	ECM
Engine control module (ECM) – immobilizer active	Incorrect/damaged key, incorrectly coded, wiring, immobilizer defective
Engine control module (ECM) – KAM error	ECM
Engine control module (ECM) – RAM error	ECM
Engine control module (ECM) – ROM error	ECM
Engine control module (ECM) – sensor supply 5V	ECM
Engine control relay	Wiring, supply voltage, engine control relay
Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM

Model: Cinquecento 900/1,1 • Seicento 900/1,1 • Panda 900/1,1  
Punto 1,1/1,2/16V • Tipo/Tempo 1,8/2,0 • Brava/Bravo 1,6  
Marea/Marea Weekend 1,6 • Coupe 2,0 16V/Turbo

**FIAT**



## Engine management

Fault location	Probable cause
Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring, supply voltage, EVAP canister purge valve, ECM
Fuel pump relay	Wiring, supply voltage, fuel pump relay
Heated oxygen sensor (HO2S)	Wiring, HO2S, air leak, ECM
Idle air control (IAC) valve	Wiring, IAC valve, ECM
Idle speed control (ISC) actuator	Wiring, ISC actuator, mechanical fault, ECM
Idle control – outside specification	Intake leak/blockage, throttle valve tight/sticking, IAC valve or ISC actuator, ECM
Ignition amplifier 1, cylinders 1 & 4 – malfunction	Wiring, supply voltage, ignition coil, ignition amplifier, ECM
Ignition amplifier 2, cylinders 2 & 3 – malfunction	Wiring, supply voltage, ignition coil, ignition amplifier, ECM
Ignition coil – malfunction	Wiring, ignition coil, ECM
Ignition coil 1, cylinders 1 & 4 – malfunction	Wiring, ignition coil, ECM
Ignition coil 2, cylinders 2 & 3 – malfunction	Wiring, ignition coil, ECM
Immobilizer circuit – malfunction	Wiring, incorrect/damaged key, immobilizer defective, ECM
Injector(s) – malfunction	Wiring, supply voltage, injector
Injector 1	Wiring, fuse, engine control relay/relay module, injector
Injector 2	Wiring, fuse, engine control relay/relay module, injector
Injector 3	Wiring, fuse, engine control relay/relay module, injector
Injector 4	Wiring, fuse, engine control relay/relay module, injector
Instrument panel, engine speed signal – circuit malfunction	Wiring, ECM
■ Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
Knock sensor (KS)	Wiring, KS, KS incorrectly tightened, ECM
Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, supply voltage, MIL lamp
Manifold absolute pressure (MAP) sensor – malfunction	Intake/exhaust leak, wiring, MAP sensor, ECM
Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, MAP sensor, HO2S, EVAP canister purge valve, injector(s), excessive fuel in engine oil
Mixture control (MC) – rich	Wiring, injector, fuel pressure, MAP sensor, ECM
Mixture control (MC) – weak	Wiring, air leak, fuel pressure, ignition system, injector, MAP sensor, HO2S, ECM
Relay module	Wiring, supply voltage, relay module
Supply voltage	Wiring, fuses, battery, alternator, ignition switch
Throttle position (TP) sensor	Wiring, TP sensor, ECM
Transmission control module (TCM) – incorrect signal	Wiring, ECM
Turbocharger (TC) wastegate regulating valve	Wiring, supply voltage, TC wastegate regulating valve, ECM
Vehicle speed signal	Wiring, VSS, ECM

■ Some models: Located in manifold absolute pressure (MAP) sensor.





# FIAT

**Model:** Panda 1,0/1,1/Uno 1,0/1,1/1,4/1,5 • Punto 1,4 GT/1,6/Tipo/Tempra 1,4/1,6 • Brava/Bravo 1,2/1,4/1,8/2,0 Marea/Marea Weekend 1,2/1,4/1,8/2,0 • Barchetta • Coupe 1,8/2,0 20V/Turbo • Fiorino 1,4/1,5/1,6

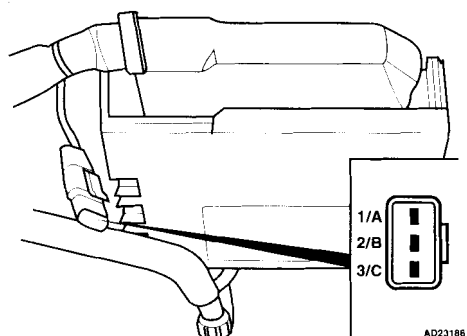
**Year:** 1988-03

**Engine code:** 141C2.000, 146C1.000, 146C3.000, 146C6.000, 146D6.000, 149C1.000, 149C5.000, 156A2.246, 156C.046, 159A3.046, 159A3.048, 159B9.000, 160A1.046, 175A3.000, 176A4.000, 176A9.000, 176B2.000, 176B6.000, 182A1.000, 182A2.000, 182A3.000, 182A5.000, 182B2.000, 182B3.000, 182B7.000, 183A1.000, 835C1.000, 836A4.000

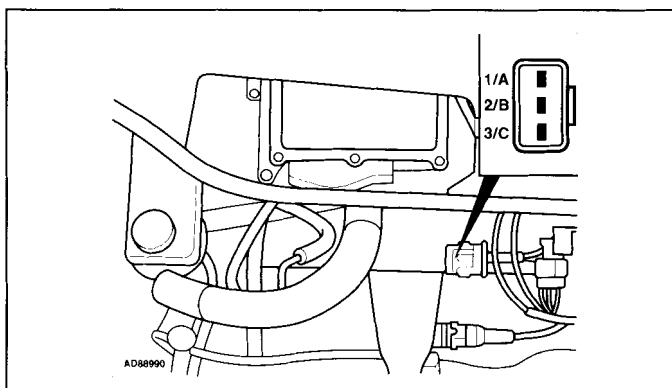
**System:** Bosch Mono-Jetronic A2.2 • Bosch Mono-Motronic MA1.7/1.7.3 • Bosch Motronic 1.5.5 Bosch Motronic ME3.1 • Bosch Motronic M2.7/M2.10.4 • GM ACG Multec • Hitachi MPI Weber-Marelli 1AW 06F

## Engine management

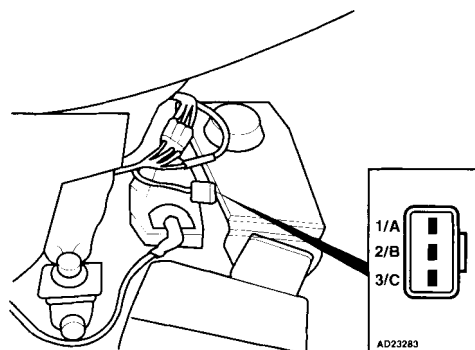
### Data link connector (DLC) locations



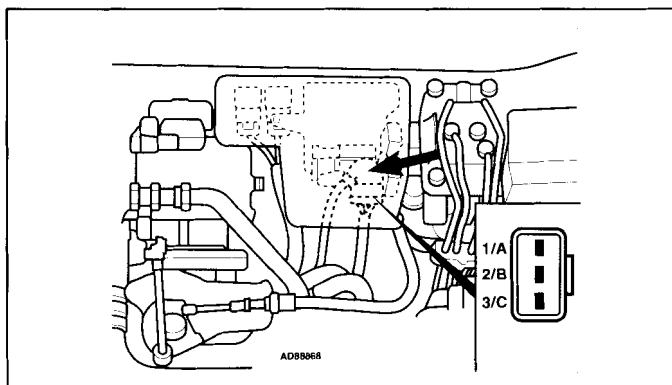
Panda/Uno, type 2 – under fascia, passenger's side



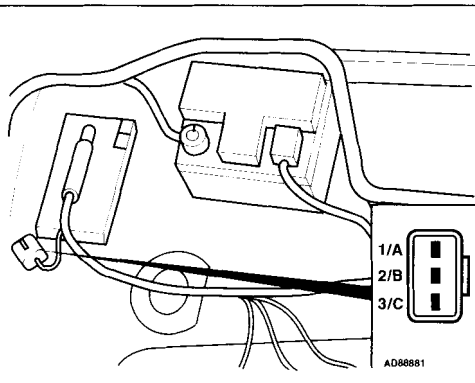
Punto GT – engine bay rear



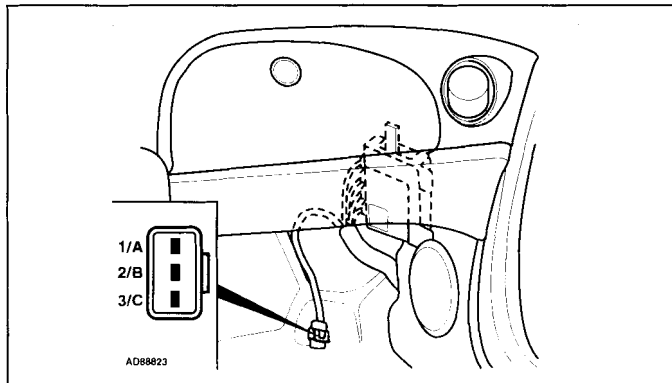
Uno, type 1 – RH engine bay



Punto 1,6 – engine bay rear



Fiorino – RH engine bay



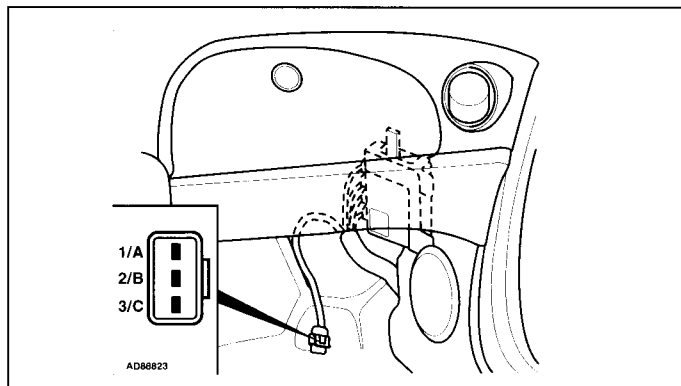
Temptra, GM ACG Multec – kick panel, passenger's side

Model: Panda 1,0/1,1/Uno 1,0/1,1/1,4/1,5 • Punto 1,4 GT/1,6/Tipo/Tempra 1,4/1,6  
Brava/Bravo 1,2/1,4/1,8/2,0 • Marea/Marea Weekend 1,2/1,4/1,8/2,0  
Barchetta • Coupe 1,8/2,0 20V/Turbo • Fiorino 1,4/1,5/1,6

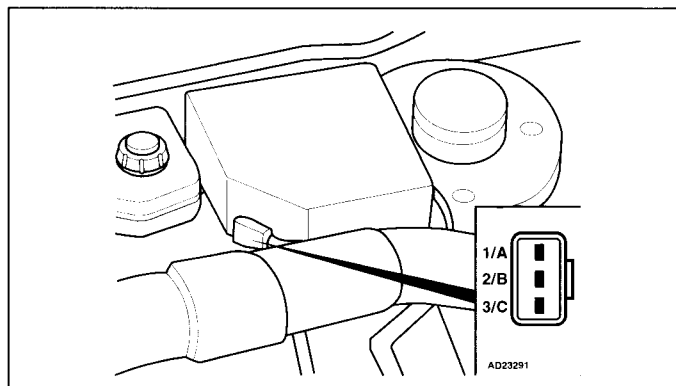
**FIAT**



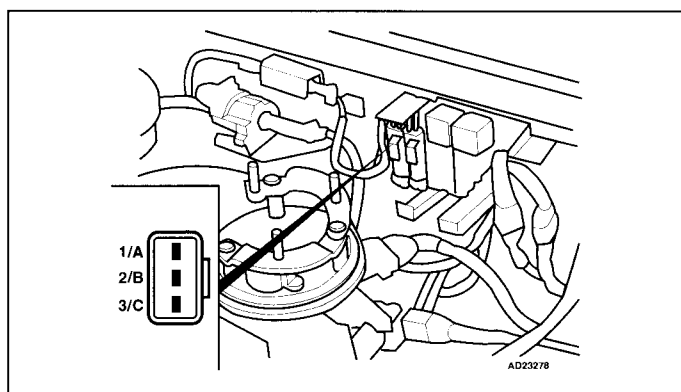
## Engine management



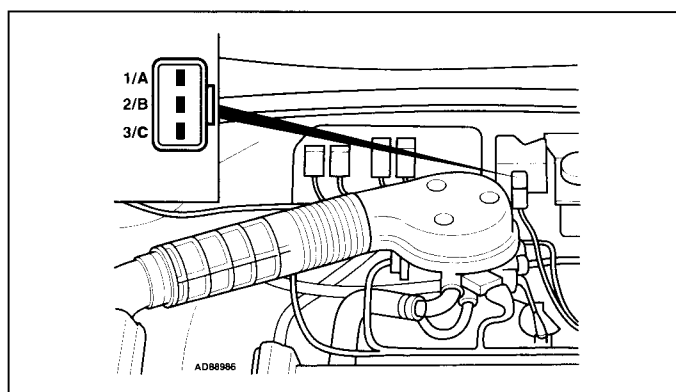
**Barchetta →1998 – kick panel, passenger's side**



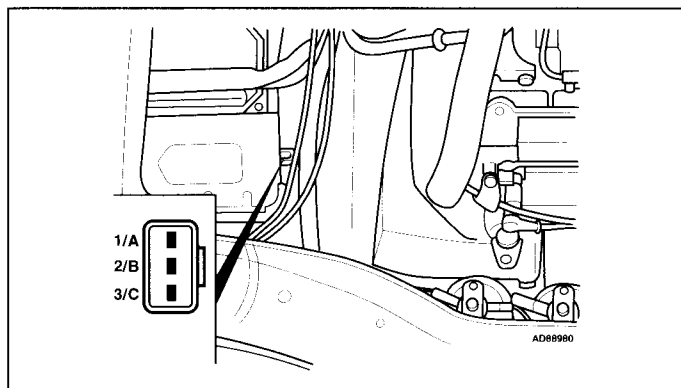
**Brava/Bravo/Marea/Marea Weekend 1,2 – LH engine bay**



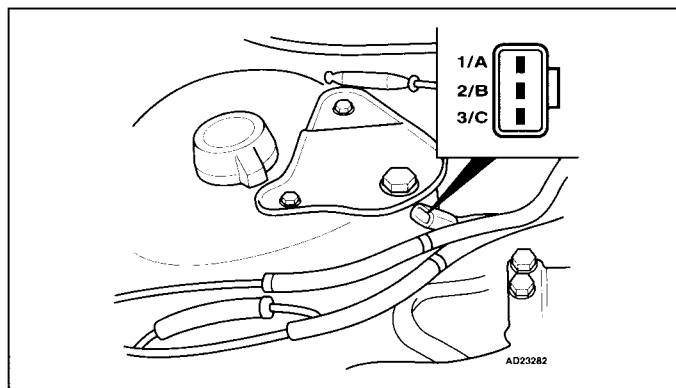
**Tipo/Tempra, Mono-Jetronic A2.2 – engine bay rear**



**Brava/Bravo/Marea/Marea Weekend 1,4 – engine bay rear**



**Tipo/Tempra, Mono-Motronic MA1.7 – RH engine bay**

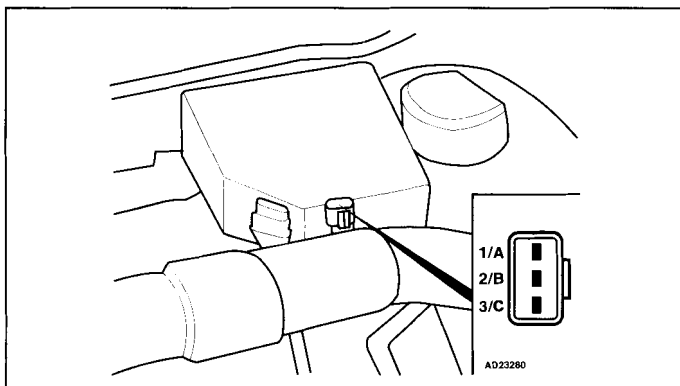
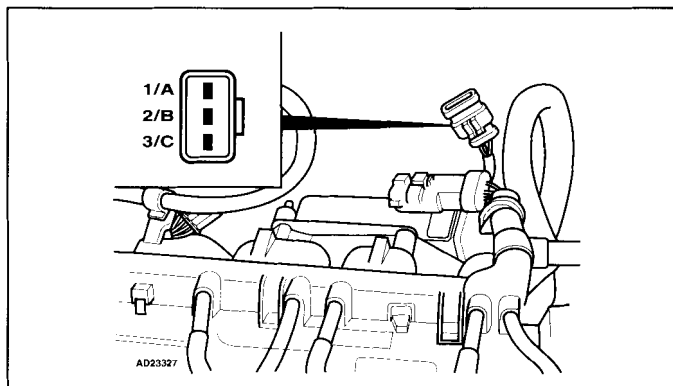
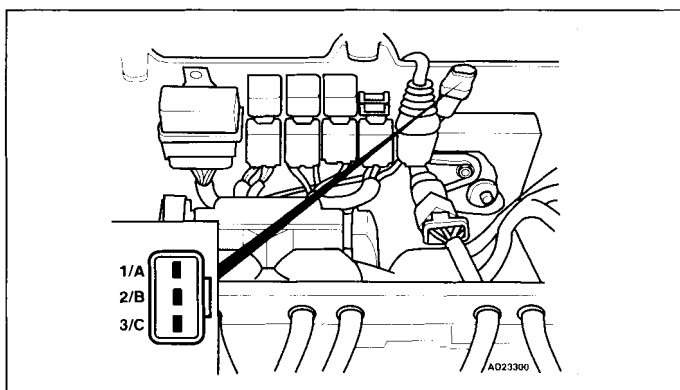
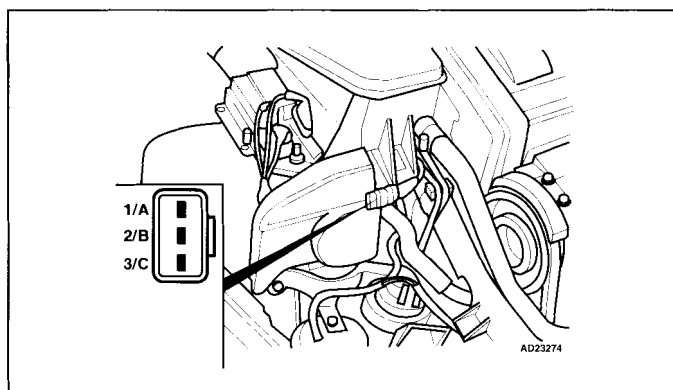
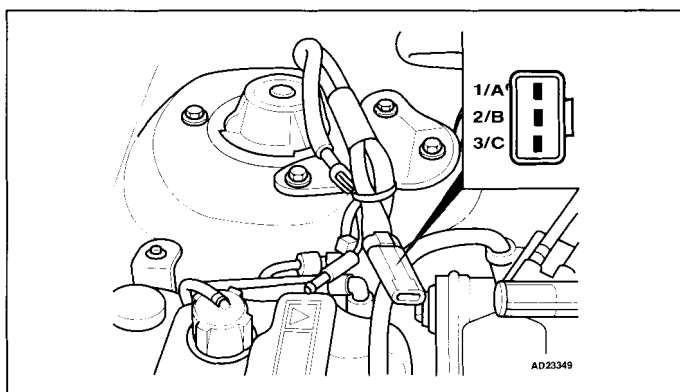


**Brava/Bravo/Marea/Marea Weekend 1,8/2,0 →1998/Coupe 2,0 20V  
→1998 – RH engine bay**

**FIAT**

Model:

Panda 1,0/1,1/Uno 1,0/1,1/1,4/1,5 • Punto 1,4 GT/1,6/Tipo/Tempira 1,4/1,6  
Brava/Bravo 1,2/1,4/1,8/2,0 • Marea/Marea Weekend 1,2/1,4/1,8/2,0  
Barchetta • Coupe 1,8/2,0 20V/Turbo • Fiorino 1,4/1,5/1,6

**Engine management****Brava/Bravo/Marea/Marea Weekend 1,8/2,0 1999 → – LH engine bay****Coupe 1,8 1998 → – engine bay rear****Barchetta 1998 → – engine bay rear****Coupe 2,0 20V Turbo/Coupe 2,0 20V 1998 → – RH engine bay****Coupe 1,8 →1998 – RH engine bay**



## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- No digital trouble codes available from vehicle manufacturer.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

### Trouble code identification

Fault location	Probable cause
Accelerator pedal position (APP) sensor – implausible signal	Wiring, APP sensor, ECM
AC signal	Wiring, AC system, AC control module
Air conditioning relay – circuit malfunction	Wiring, supply voltage, AC system
Barometric pressure (BARO) sensor	Wiring, BARO sensor, ECM
Camshaft position (CMP) actuator – circuit malfunction	Wiring, CMP actuator relay, CMP actuator, ECM
Camshaft position (CMP) sensor – circuit malfunction	Wiring, CMP sensor, ECM
■ Closed throttle position (CTP) switch – malfunction	Wiring, mechanical fault, ISC actuator, ECM
Crankshaft position (CKP) sensor/engine speed (RPM) sensor – malfunction	Wiring, air gap, CKP/RPM sensor, mechanical fault, ECM
Engine control module (ECM) – defective	ECM
Engine control relay	Wiring, supply voltage, engine control relay
Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring, supply voltage, EVAP canister purge valve, ECM
Fuel pump relay	Wiring, supply voltage, fuel pump relay
Heated oxygen sensor (HO2S)	Wiring, HO2S, air leak, ECM
Idle air control (IAC) valve	Wiring, IAC valve, ECM
Idle speed control (ISC) actuator/throttle motor	Wiring, ISC actuator/throttle motor, mechanical fault, ECM
Idle control – outside specification	Intake leak/blockage, throttle valve tight/sticking, IAC valve or ISC actuator, ECM
Ignition amplifier – malfunction	Wiring, supply voltage, ignition coil, ignition amplifier, ECM
Ignition switch – circuit malfunction	Wiring, supply voltage, ignition switch
Immobilizer circuit – malfunction	Wiring, immobilizer defective, ECM
Injector(s) – malfunction	Wiring, supply voltage, injector
Injector 1	Wiring, fuse, engine control relay/relay module, injector
Injector 2	Wiring, fuse, engine control relay/relay module, injector
Injector 3	Wiring, fuse, engine control relay/relay module, injector
Injector 4	Wiring, fuse, engine control relay/relay module, injector
Injector 5	Wiring, fuse, engine control relay/relay module, injector



**FIAT**

Model: Panda 1,0/1,1/Uno 1,0/1,1/1,4/1,5 • Punto 1,4 GT/1,6/Tipo/Tempra 1,4/1,6  
Brava/Bravo 1,2/1,4/1,8/2,0 • Marea/Marea Weekend 1,2/1,4/1,8/2,0  
Barchetta • Coupe 1,8/2,0 20V/Turbo • Fiorino 1,4/1,5/1,6

**Engine management**

<b>Fault location</b>	<b>Probable cause</b>
<b>2</b> Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
Intake manifold air control solenoid – circuit malfunction	Wiring, intake manifold air control solenoid, ECM
Knock sensor(s) (KS)	Wiring, KS, KS incorrectly tightened, ECM
Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, supply voltage, MIL
<b>3</b> Manifold absolute pressure (MAP) sensor – malfunction	Intake/exhaust leak, wiring, MAP sensor, ECM
Mass air flow (MAF) sensor	Wiring, intake leak, air filter blocked, MAF sensor, ECM
Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, MAP/MAF sensor, HO2S, EVAP canister purge valve, injector(s), excessive fuel in engine oil
Mixture control (MC) – rich	Wiring, injector, fuel pressure, MAF sensor, ECM
Mixture control (MC) – weak	Wiring, air leak, fuel pressure, ignition system, injector, MAF sensor, HO2S, ECM
Relay module	Wiring, supply voltage, relay module
Supply voltage	Wiring, fuses, battery, alternator, ignition switch
<b>4</b> Throttle position (TP) sensor	Wiring, TP sensor, ECM
Transmission control module (TCM) – incorrect signal	Wiring, ECM
Turbocharger (TC) pressure – control difference	Intake/exhaust leak, hoses interchanged/not connected, MAP sensor, TC wastegate regulating valve, turbocharger (TC) wastegate actuator, TC
Turbocharger (TC) wastegate regulating valve	Wiring, supply voltage, TC wastegate regulating valve, ECM
Vehicle speed signal	Wiring, VSS, ECM

- 1** Located in idle speed control (ISC) actuator.  
**2** Some models: Located in manifold absolute pressure (MAP) sensor.  
**3** Punto GT: Located in engine control module (ECM).  
**4** Some models: Located in idle speed control (ISC) actuator.





Model: Brava/Bravo 1,9 JTD  
Marea/Marea Weekend 1,9/2,4 JTD

Year: 1995-03

Engine code: 182A7.000, 182B4.000, 185A2.000, 185A6.000,  
189B9.000, 186A6.000

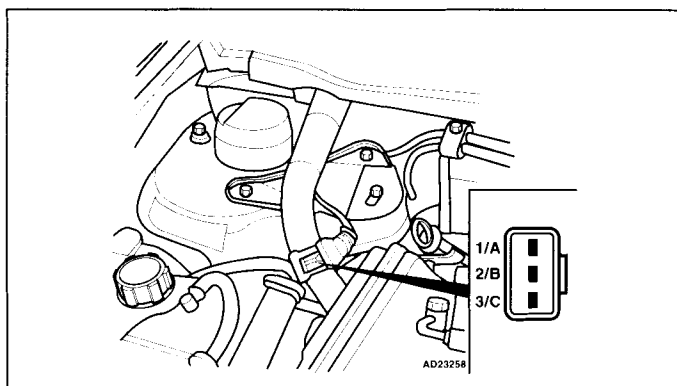
System: Bosch EDC 15C

**FIAT**



Engine management

## Data link connector (DLC) locations



RH engine bay

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1320	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – signal variation	Wiring, CKP sensor, CMP sensor, ECM
P1503	Fuel pressure control solenoid	Wiring, fuel system pressure sensor, fuel pressure control solenoid, fuel system, ECM



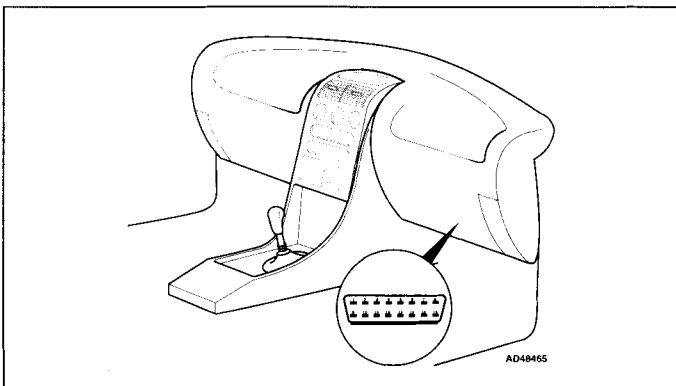


**FIAT**

Model: Stilo 1,9 JTD  
Year: 2001-04  
Engine code: 192 A1.000, 192 A3.000  
System: Bosch EDC 15C7

## Engine management

### Data link connector (DLC) locations



Under fascia, driver's side

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

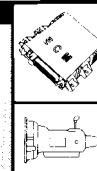
- The engine control module (ECM) fault memory can be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

EOBD type	Fault location	Probable cause
P0 <b>1</b>	Refer to EOBD trouble code table	—

**1** No vehicle specific 'P1' codes currently available from manufacturer.





**Model:** Ka 1,3 • Fiesta 1,25/1,3/1,4/1,8D/TD • Escort/Orion 1,3/1,6/1,8 • Fusion 1,25/1,4/1,6/1,8  
Focus 1,4/1,6/1,8/2,0/1,8 TDCi • FocusC-MAX 1,6/1,8/2,0 TDCi • Puma 1,4/1,6/1,7  
Streetka/Sportka 1,6 • Mondeo/Cougar 1,6/1,8/2,0/2,5/1,8/2,0 TD/2,0 TDCi/2,5  
Scorpio 2,0/2,3/2,9/2,5 TD • Galaxy 2,0/2,3/2,8/1,9 TD/TDI • Explorer/Windstar 3,0/4,0  
Transit/Tourneo Connect 1,8 • Transit 2,0/2,3/2,0 TD/2,4 TD

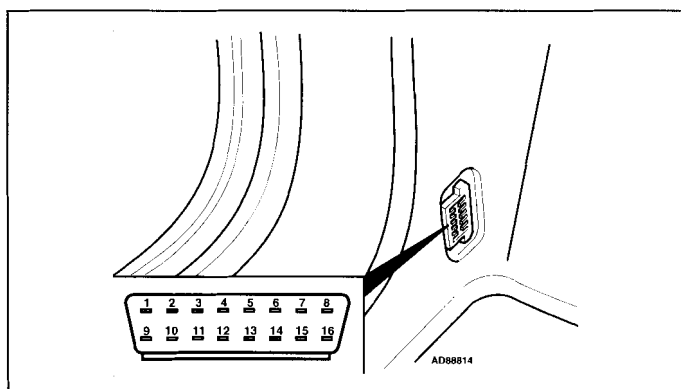
**Year:** 1994-04

**Engine code:** 1Z, AAA, ABFA, AFN, AHU, ALDA, AMY, ANU, AUY, AVG, AYL, BHDA/B, BOB, C9DA, C9DA/B, C9DC, CDBB, CDB/C, CDDA, CGBA/B, CHBA/B, CJBA/B, DHA, DHB, DHC, DHD, DHE, DHF, DHG, D2FA, D3FA, D4FA, D5BA, D6BA, E, EDBA/C, EDBB, EDBD, EDDB, EDDC, EDDD, EDDF, EYDB, EYDC, EYDF, EYDG, EYDI, EYDJ, EYDD/E, E5FA, E5SA, E5SB, FFDA, FHA, FHD, FHE, FHF, FMBA, FMBA/B, FXDA/C, FXDB/D, FYDA/C, FYDB/D, FYDH, F3FA, F4FA, F9DA/B, HJBA/B, HMDA, JJA, JJB, JJC, JJD, JJE, JJJ, JJK, JKL, JJM, J4B, J4C, J4D, J4J, J4K, J4L, J4M, J4N, J4P, J4Q, J4R, J4S, J4T, LCBA/C, LCBB, LCBD, LCBE, L1J, L1K, L1L, L1N/Q, L1T, L1V, L1W, MABA, MABB, MEBA, MHA, MHB, NGA, NGB, NGC, NGD, NSD/E, NSF, NSG, NSH, N3A, RFN, RFS, RKB, RKC, RKF, RKH, RKK, RTJ, RTK, RTN, RTP, RTQ, RVA, SCC, SCD, SEA, SEB, SEC, SGA, V6, Y5A, Y5B, ZVSA

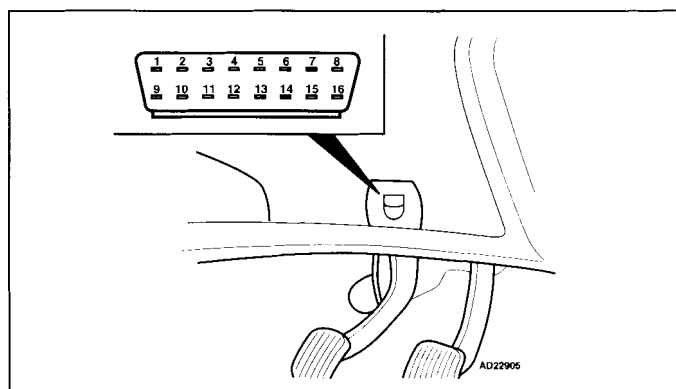
**System:** Ford EEC V/SIM 19 • Ford Black Oak • Bosch Motronic • Bosch EDC • Delphi • Siemens

Engine management/transmission

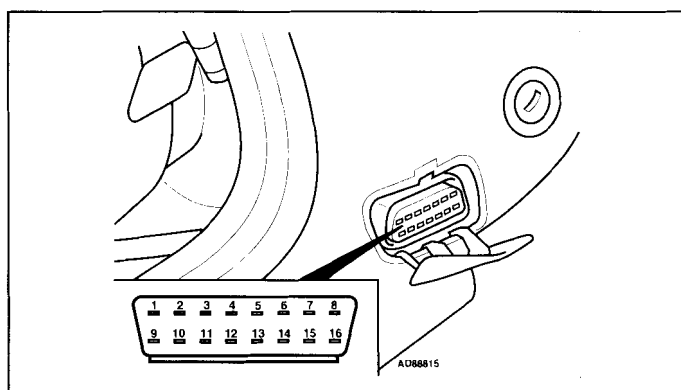
## Data link connector (DLC) locations



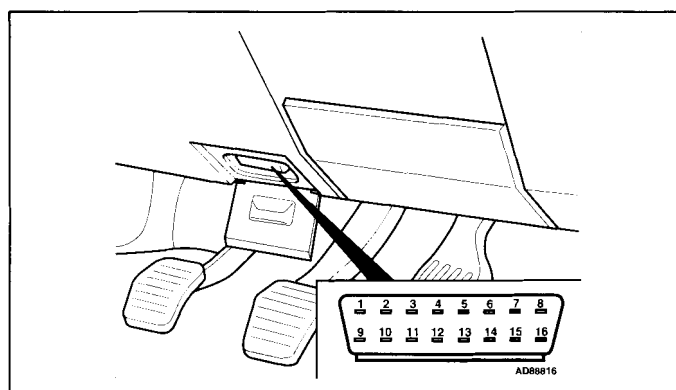
**Ka**



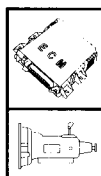
**Focus**



**Fiesta/Escort/Orion/Puma**



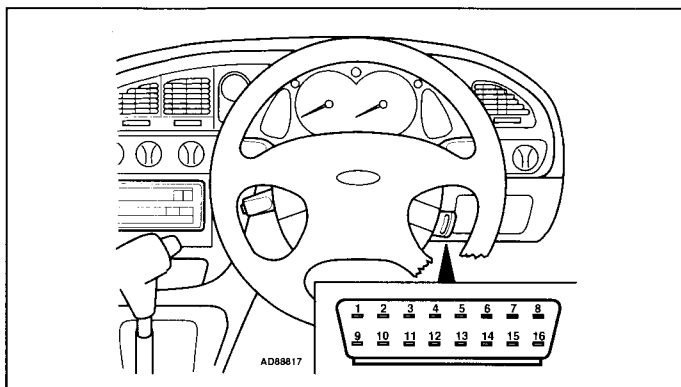
**Mondeo/Cougar**



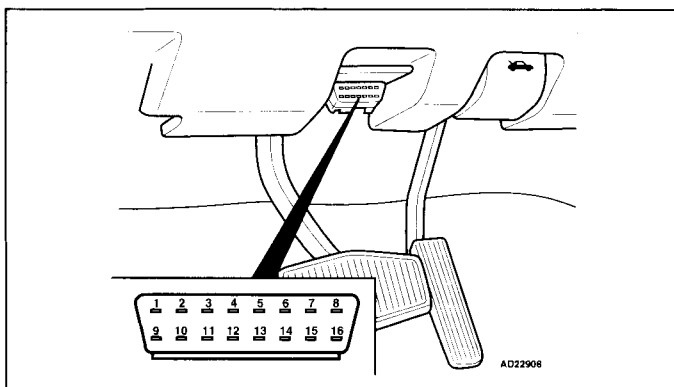
# FORD

Model: Ka • Fiesta • Escort/Orion • Fusion • Focus • FocusC-MAX • Puma • Streetka/Sportka  
Mondeo/Cougar • Scorpio • Galaxy • Explorer/Windstar • Transit/Tourneo Connect

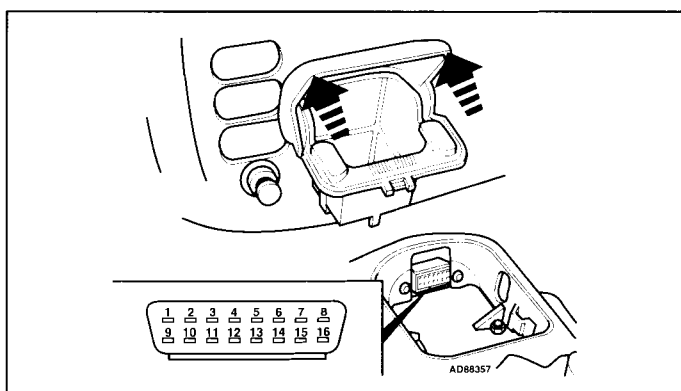
## Engine management/transmission



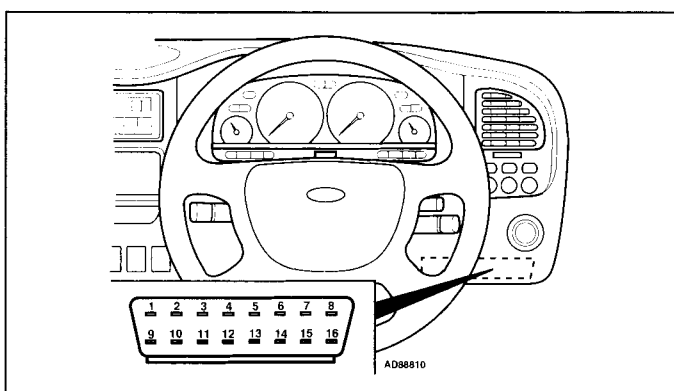
Scorpio



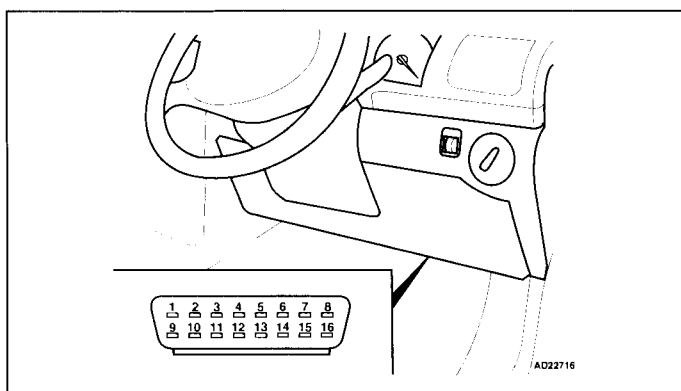
Explorer/Windstar



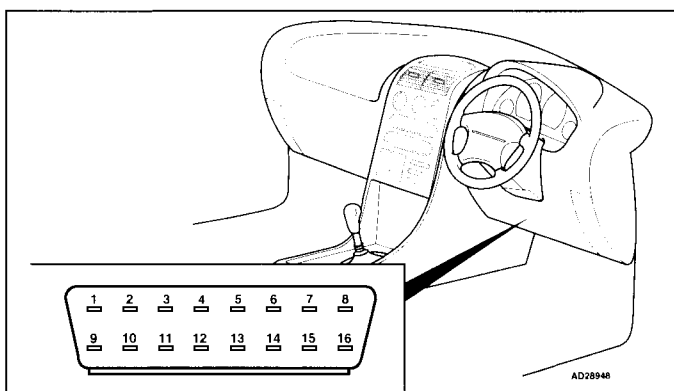
Galaxy →05/00 – under ashtray



Transit



Galaxy 06/00 → – fascia, driver's side



All models – 2001 →

## Trouble codes

**NOTE:** Engine control module (ECM) incorporates transmission control function.

## General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

## Accessing and erasing

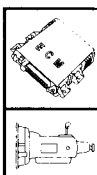
- The ECM fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).



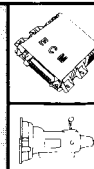
## Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P0167	Fuel timing error (Diesel engines only)	Wiring, CKP sensor, injector needle lift sensor, fuel injection pump, fuel injection pump, fuel injection pump control module, ECM
P1000	System readiness test not complete	–
P1001	System diagnosis incomplete	–
P1100	Mass air flow (MAF) sensor – circuit intermittent	Wiring, MAF sensor
P1101	Mass air flow (MAF) sensor – out of self-test range	Wiring, MAF sensor
P1105	Dual alternator upper fault	–
P1106	Dual alternator lower fault	–
P1107	Dual alternator lower circuit	–
P1108	Dual alternator battery lamp circuit	–
P1109	Intake air temperature (IAT) sensor 2 – circuit intermittent	Wiring, IAT sensor
P1111	System pass	–
P1112	Intake air temperature (IAT) sensor – circuit intermittent	Wiring, IAT sensor
P1114	Intake air temperature (IAT) sensor 2 – circuit low – supercharged/turbocharged engines	–
P1115	Intake air temperature (IAT) sensor 2 – circuit high – supercharged/turbocharged engines	Wiring, IAT sensor
P1116	Engine coolant temperature (ECT) sensor – out of self-test range	Wiring, ECT sensor
P1117	Engine coolant temperature (ECT) sensor – circuit intermittent	Wiring, ECT sensor
P1118	Manifold air temperature (MAT) sensor – circuit low	Wiring, MAT sensor, ECM
P1119	Manifold air temperature (MAT) sensor – circuit high	Wiring, MAT sensor, ECM
P1120	Throttle position (TP) sensor – out of range, low	Wiring, TP sensor
P1121	Throttle position (TP) sensor – inconsistent with MAF/MAP sensor signal	Wiring, MAF/MAP/TP sensor
P1122	Accelerator pedal position (APP) sensor A – circuit low	Wiring, APP sensor, ECM
P1123	Accelerator pedal position (APP) sensor A – circuit high	Wiring, APP sensor, ECM
P1124	Throttle position (TP) sensor – out of self-test range	Wiring, TP sensor
P1125	Throttle position (TP) sensor – circuit intermittent	Wiring, TP sensor
P1127	Exhaust temperature, out of range – O2S tests not complete	Exhaust leak, mechanical fault
P1128	Heated oxygen sensor (HO2S) 1 – transposed	Wiring
P1129	Heated oxygen sensor (HO2S) 2 – transposed	Wiring



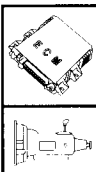
**FORD**Model: Ka • Fiesta • Escort/Orion • Fusion • Focus • FocusC-MAX • Puma • Streetka/Sportka  
Mondeo/Cougar • Scorpio • Galaxy • Explorer/Windstar • Transit/Tourneo Connect**Engine management/transmission**

EOBD type	Fault location	Probable cause
P1130	Heated oxygen sensor (HO2S) – fuel trim (FT) at limit	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1131	Heated oxygen sensor (HO2S) – not switching, fuel trim (FT) weak mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1132	Heated oxygen sensor (HO2S) – not switching, fuel trim (FT) rich mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1133	Fuel control shifted lean, bank 1	Fuel pressure, injectors, MAF/MAP sensor, intake leak
P1134	Fuel control shifted rich, bank 1	Fuel pressure, injectors, MAF/MAP sensor, EVAP system
P1135	Accelerator pedal position (APP) sensor A – circuit intermittent	Wiring, APP sensor, ECM
P1137	Heated oxygen sensor (HO2S) 1, bank 2 – no activity detected, lean mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1138	Heated oxygen sensor (HO2S) 1, bank 2 – no activity detected, rich mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1139	Water in fuel warning lamp – circuit malfunction	Wiring, water in fuel warning lamp
P1140	Water in fuel	Water in fuel
P1141	Fuel restriction warning lamp – circuit malfunction	Wiring, fuel restriction warning lamp
P1142	Fuel restriction	Blocked fuel filter
P1145	Calculated torque error	–
P1147	Manifold air temperature (MAT) sensor/intake air temperature (IAT) sensor – correlation	Wiring, MAT sensor, IAT
P1148	Alternator 2 – control circuit	Wiring, alternator
P1149	Alternator 2 – monitor – voltage high	Wiring, alternator
P1150	Heated oxygen sensor (HO2S) – not switching, fuel trim (FT) at limit	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1151	Heated oxygen sensor (HO2S) – not switching, sensor indicates weak mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1152	Heated oxygen sensor (HO2S) – not switching, sensor indicates rich mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1153	Fuel control shifted lean, bank 2	Fuel pressure, injectors, MAF/MAP sensor, intake leak
P1154	Fuel control shifted rich, bank 2	Fuel pressure, injectors, MAF/MAP sensor, EVAP system
P1155	Alternative fuel control module has activated the MIL	–
P1157	Heated oxygen sensor (HO2S) 2, bank 2 – no activity detected, lean mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1158	Heated oxygen sensor (HO2S) 2, bank 2 – no activity detected, rich mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1170	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid
P1171	Rotor sensor	–
P1172	Rotor control	–
P1173	Rotor calibration	–
P1174	Cam sensor	–
P1175	Cam control	–
P1176	Cam calibration	–



Engine management/transmission

EOBD type	Fault location	Probable cause
P1177	Synchronization	–
P1178	Boltup limits	–
P1183	Engine oil temperature (EOT) sensor – circuit malfunction	Wiring, engine oil temperature sensor
P1184	Engine oil temperature (EOT) sensor – out of self test range	Wiring, engine oil temperature sensor
P1185	Fuel pump (FP) temperature sensor – voltage high	Wiring, FP temperature sensor
P1186	Fuel pump (FP) temperature sensor – voltage low	Wiring, FP temperature sensor
P1187	Variant selection	ECM incorrectly coded
P1188	Calibration memory	–
P1189	Injection pump speed signal	Wiring, injection pump speed sensor, ECM
P1190	Calibration resistor out of range	Wiring, calibration resistor
P1191	Key line voltage	–
P1192	V external	–
P1193	EGR driver over current	Wiring, EGR solenoid
P1194	Engine control module (ECM) analogue/digital converter	ECM
P1195	Engine control module (ECM) – communications chip failed to initialize	ECM
P1196	Key off voltage high	Wiring, engine control relay
P1197	Key off voltage low	Wiring, engine control relay
P1198	Injection pump rotor control – underfueling	–
P1199	Fuel level position sensor – input circuit low	Wiring, fuel level position sensor
P1200	Injector – range/performance problem	Wiring, injector, ECM
P1209	Injector control pressure – test fault	Wiring, injector, ECM
P1210	Injector control pressure higher than desired (engine off)	–
P1211	Injector control pressure – high/low	Wiring, injector, ECM
P1212	Injector control pressure lower than desired – engine cranking or running	Wiring, fuel pressure, low oil pressure, low oil level
P1214	Accelerator pedal position (APP) sensor B – circuit intermittent	Wiring, APP sensor
P1215	Accelerator pedal position (APP) sensor C – circuit low input	Wiring, APP sensor
P1216	Accelerator pedal position (APP) sensor C – circuit high input	Wiring, APP sensor
P1217	Accelerator pedal position (APP) sensor C – circuit intermittent	Wiring, APP sensor
P1218	Camshaft position (CMP) sensor – voltage high	Wiring, CMP sensor
P1219	Camshaft position (CMP) sensor – voltage low	Wiring, CMP sensor
P1220	Series throttle control system	–
P1221	Traction control system	–

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EOBD type	Fault location	Probable cause
P1222	Accelerator pedal position (APP) sensor B – circuit low	Wiring, APP sensor
P1223	Accelerator pedal position (APP) sensor B – circuit high	Wiring, APP sensor
P1223	Redundant emergency stop	–
P1224	Throttle position (TP) sensor B – out of self test range	Wiring, TP sensor
P1225	Injector needle lift sensor	Wiring, dirty fuel, air in fuel, injector needle lift sensor
P1226	Fuel quantity adjuster position sensor – circuit malfunction	Wiring, fuel quantity adjuster position sensor
P1227	Fuel injection timing solenoid	Wiring, dirty fuel, air in fuel, fuel injection timing solenoid
P1228	Vehicle speed governor	Wiring, vehicle speed governor
P1229	Fuel injection timing solenoid	Wiring, dirty fuel, air in fuel, fuel injection timing solenoid
P1230	Fuel pump (FP) – low speed malfunction	Wiring, fuel pump (FP)
P1231	Fuel pump (FP) – secondary circuit low, high speed	Wiring, fuel pump (FP)
P1232	Fuel pump (FP) speed – primary circuit, two speed fuel pump (FP)	Wiring, fuel pump (FP)
P1233	Fuel pump (FP) – control module disabled or off line	Wiring, fuel pump (FP), ECM
P1234	Fuel pump (FP) – control module disabled or off line	Wiring, fuel pump (FP), ECM
P1235	Fuel pump (FP) control – out of range	Wiring, FP control module
P1236	Fuel pump (FP) control – out of range	Wiring, FP control module
P1237	Fuel pump (FP) – secondary circuit malfunction	Wiring, FP control module
P1238	Fuel pump (FP) – secondary circuit malfunction	Wiring, FP, FP control module
P1239	Speed fuel pump (FP) positive feed	–
P1240	Sensor power supply	Wiring, ECM
P1243	Second fuel pump (FP) – malfunction, earth fault	Wiring, fuel pump (FP)
P1244	Alternator – high input	Wiring, alternator
P1245	Alternator – low input	Wiring, alternator
P1246	Alternator	Wiring, alternator
P1247	Turbocharger boost pressure low	Wiring, turbocharger (TC) wastegate actuator, turbocharger
P1248	Turbocharger boost pressure not detected	Wiring, turbocharger
P1249	Wastegate control valve – performance	Turbocharger
P1252	Accelerator pedal position (APP) sensor – signal correlation, high	Wiring, APP sensor
P1253	Accelerator pedal position (APP) sensor – signal correlation, low	Wiring, APP sensor
P1254	Accelerator pedal position (APP) sensor – signal correlation, high	Wiring, APP sensor
P1255	Accelerator pedal position (APP) sensor – signal correlation, low	Wiring, APP sensor





EOBD type	Fault location	Probable cause
P1256	Accelerator pedal position (APP) sensor – signal correlation	Wiring, APP sensor
P1257	Accelerator pedal position (APP) sensor – signal correlation	Wiring, APP sensor
P1258	Accelerator pedal position (APP) sensor – signal correlation	Wiring, APP sensor
P1259	Immobilizer to ECM signal error	Wiring, immobilizer control module
P1260	Theft detected – vehicle immobilized	–
P1261	Injector 1 – short circuit	Wiring, injector, ECM
P1262	Injector 2 – short circuit	Wiring, injector, ECM
P1263	Injector 3 – short circuit	Wiring, injector, ECM
P1264	Injector 4 – short circuit	Wiring, injector, ECM
P1265	Injector 5 – short circuit	Wiring, injector, ECM
P1266	Injector 6 – short circuit	Wiring, injector, ECM
P1267	Injector 7 – short circuit	Wiring, injector, ECM
P1268	Injector 8 – short circuit	Wiring, injector, ECM
P1270	Maximum engine RPM or vehicle speed limit reached	–
P1271	Injector 1 – short circuit	Wiring, injector, ECM
P1272	Injector 2 – short circuit	Wiring, injector, ECM
P1273	Injector 3 – short circuit	Wiring, injector, ECM
P1274	Injector 4 – short circuit	Wiring, injector, ECM
P1275	Injector 5 – short circuit	Wiring, injector, ECM
P1276	Injector 6 – short circuit	Wiring, injector, ECM
P1277	Injector 7 – short circuit	Wiring, injector, ECM
P1278	Injector 8 – short circuit	Wiring, injector, ECM
P1280	Injector control pressure sensor – voltage low	Wiring, injector control pressure sensor, ECM
P1281	Injector control pressure sensor – voltage high	Wiring, injector control pressure sensor, ECM
P1282	Injector control pressure higher than desired – engine running	Wiring, injector control pressure sensor, ECM
P1283	Injector pressure regulator – control circuit	Wiring, injector, ECM
P1284	Injector control pressure failure	Wiring, injector, injector control pressure sensor, ECM
P1285	Cylinder head temperature (CHT) sensor – over-temperature condition	Wiring, cooling system fault, CHT sensor
P1286	Fuel pulse width in range but lower than expected	–
P1287	Fuel pulse width in range but higher than expected	–
P1288	Cylinder head temperature (CHT) sensor – out of self-test range	Wiring, cooling system fault, CHT sensor
P1289	Cylinder head temperature (CHT) sensor – high input	Wiring, cooling system fault, CHT sensor
P1290	Cylinder head temperature (CHT) sensor – low input	Wiring, cooling system fault, CHT sensor



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EOBD type	Fault location	Probable cause
P1291	Injector, bank 1 – short circuit to positive/earth	Wiring, injector, ECM
P1292	Injector, bank 2 – short circuit to positive/earth	Wiring, injector, ECM
P1293	Injector, bank 1 – open circuit	Wiring, injector, ECM
P1294	Injector, bank 2 – open circuit	Wiring, injector, ECM
P1295	Injector, bank 1 – multiple faults	Wiring
P1296	Injector, bank 2 – multiple faults	Wiring
P1297	Injectors – shorted together	Wiring, ECM
P1298	Injector control module	Injector control module
P1299	Cylinder head temperature (CHT) sensor – over-temperature protection system activated	Wiring, cooling system fault, CHT sensor
P1300	Boost calibration fault	–
P1301	Boost calibration – high	–
P1302	Boost calibration – low	–
P1303	Exhaust gas recirculation (EGR) system – calibration fault	–
P1304	Exhaust gas recirculation (EGR) system – calibration high	–
P1305	Exhaust gas recirculation (EGR) system – calibration low	–
P1306	Transmission kick-down relay – pull in circuit malfunction	Wiring, transmission kick-down relay
P1307	Transmission kick-down relay – hold circuit malfunction	Wiring, transmission kick-down relay
P1308	AC compressor clutch – circuit malfunction	Wiring, AC compressor clutch
P1309	Misfire monitor hardware – CMP misaligned, CKP/CMP noise, ECM internal fault	CKP sensor, CMP sensor, mechanical fault, ECM
P1310	Ionization misfire detection module	Ionization misfire detection module
P1311	Ionization misfire detection module – communication fault	Wiring, ionization misfire detection module
P1316	Injector driver module – trouble codes stored	Check trouble codes
P1317	Injector circuit/injector driver module – codes not retrieved	–
P1321	Injector 9 – short circuit	Wiring, injector
P1322	Injector 10 – short circuit	Wiring, injector
P1323	Injector 11 – short circuit	Wiring, injector
P1324	Injector 12 – short circuit	Wiring, injector
P1325	Injector 9 – open circuit	Wiring, injector
P1326	Injector 10 – open circuit	Wiring, injector
P1327	Injector 11 – open circuit	Wiring, injector
P1328	Cylinder 12 – open circuit	Wiring, injector
P1329	Injector control pressure – higher than desired, engine running	–
P1330	Injector control pressure – lower than desired, engine running	–

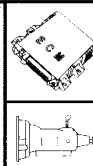


EOBD type	Fault location	Probable cause
P1331	Turbocharger/supercharger boost, high side – control open circuit	Wiring, turbocharger (TC) wastegate actuator, supercharger (SC) bypass valve
P1332	Turbocharger/supercharger boost, high side – control voltage low	Wiring, turbocharger (TC) wastegate actuator, supercharger (SC) bypass valve
P1333	Turbocharger/supercharger boost, high side – control voltage high	Wiring, turbocharger (TC) wastegate actuator, supercharger (SC) bypass valve
P1334	Exhaust gas recirculation (EGR) throttle position sensor – minimum/maximum stop performance	Wiring, EGR throttle position sensor
P1335	Exhaust gas recirculation (EGR) valve position sensor – minimum/maximum stop performance	Wiring, EGR valve position sensor
P1336	Crankshaft/camshaft sensor – range/performance problem	Wiring, CMP sensor, mechanical fault
P1337	Throttle position – output circuit	Wiring, TP sensor
P1340	Camshaft position (CMP) sensor, circuit B – circuit malfunction	Wiring, CMP sensor
P1341	Camshaft position (CMP) sensor, circuit B – range/performance problem	Wiring, CMP sensor
P1342	Accelerator pedal position (APP) sensor, A – range/performance problem	Wiring, APP sensor, ECM
P1343	Accelerator pedal position (APP) sensor, B – range/performance problem	Wiring, APP sensor, ECM
P1344	Accelerator pedal position (APP) sensor, C range/performance problem	Wiring, APP sensor, ECM
P1351	Ignition system diagnostic monitor – input circuit malfunction	Wiring, ignition control module, ECM
P1352	Ignition coil A – primary circuit malfunction	Wiring, ignition coil
P1353	Ignition coil B – primary circuit malfunction	Wiring, ignition coil
P1354	Ignition coil C – primary circuit malfunction	Wiring, ignition coil
P1355	Ignition coil D – primary circuit malfunction	Wiring, ignition coil
P1356	Ignition system diagnostic monitor indicates engine not turning	–
P1357	Ignition system diagnostic monitor pulse width not defined	–
P1358	Ignition system diagnostic monitor – signal out of self-test range	Wiring, ignition control module, ECM
P1359	Ignition system – spark output (SPOUT) signal – circuit malfunction	Wiring, ignition control module, ECM
P1360	Ignition coil A – secondary circuit malfunction	Wiring, ignition coil
P1361	Ignition coil B – secondary circuit malfunction	Wiring, ignition coil
P1362	Ignition coil C – secondary circuit malfunction	Wiring, ignition coil
P1363	Ignition coil D – secondary circuit malfunction	Wiring, ignition coil
P1364	Ignition coil – primary circuit malfunction	Wiring, ignition coil
P1365	Ignition coil – secondary circuit malfunction	Wiring, HT leads, spark plugs, distributor, ignition coil
P1366	Ignition spare	–
P1367	Ignition spare	–



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<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1368	Ignition spare	–
P1369	Engine temperature warning lamp – circuit malfunction	Wiring, fuses, instruments assembly
P1377	Injector – over voltage shut-down	Wiring, alternator
P1378	Fuel injector control module – system voltage low	Wiring, alternator, battery
P1379	Fuel injector control module – system voltage high	Wiring, alternator, battery
P1380	Camshaft position (CMP) actuator – circuit malfunction	Wiring, CMP actuator
P1381	Camshaft position (CMP) actuator – timing over advanced	Wiring, timing belt/chain, CMP actuator
P1383	Camshaft position (CMP) actuator – timing over retarded	Wiring, timing belt/chain, CMP actuator
P1385	Camshaft position (CMP) actuator, bank 2 circuit malfunction	Wiring, CMP actuator
P1386	Camshaft position timing, bank 2 – over advanced	–
P1388	Camshaft position timing, bank 2 – over retarded	–
P1389	Glow plug – circuit malfunction	Wiring, glow plug
P1390	Octane coding plug – in use/open circuit	Wiring
P1391	Glow plug, bank 1 – circuit malfunction	Wiring, glow plug
P1392	Glow plug, bank 1 – circuit malfunction	Wiring, glow plug
P1393	Glow plug, bank 2 – circuit malfunction	Wiring, glow plug
P1394	Glow plug, bank 2 – circuit malfunction	Wiring, glow plug
P1395	Glow plug monitor fault, bank 1	Wiring
P1396	Glow plug monitor fault, bank 2	Wiring
P1397	System voltage out of self test range	Wiring, battery, alternator
P1399	Glow plug – circuit malfunction	Wiring, glow plug
P1400	Exhaust gas recirculation (EGR) pressure sensor – circuit malfunction, low input	Wiring, EGR pressure sensor
P1401	Exhaust gas recirculation (EGR) pressure sensor – circuit malfunction, high input	Wiring, EGR pressure sensor
P1402	Exhaust gas recirculation (EGR) system – metering orifice restricted	Metering orifice
P1403	Differential pressure feedback sensor, EGR system – hoses transposed	Hoses transposed
P1404	Exhaust gas recirculation (EGR) temperature sensor – circuit malfunction	Wiring, EGR temperature sensor
P1405	Exhaust gas recirculation (EGR) system – upstream hose off or plugged	EGR hoses
P1406	Exhaust gas recirculation (EGR) system – downstream hose off or blocked	EGR hoses
P1407	Exhaust gas recirculation (EGR) – no flow detected	Hoses blocked/leaking, EGR valve



Engine management/transmission

EOBD type	Fault location	Probable cause
P1408	Exhaust gas recirculation (EGR) – flow out of self-test range	Wiring, EGR solenoid, EGR valve
P1409	Exhaust gas recirculation (EGR) solenoid – circuit malfunction	Wiring, EGR solenoid
P1410	Air filter inlet control solenoid – circuit malfunction	Wiring, air filter inlet control solenoid
P1411	Secondary air injection (AIR) incorrect downstream flow detected	Wiring, AIR relay, mechanical fault
P1412	Exhaust gas recirculation (EGR) valve – seized	EGR valve
P1413	Secondary air injection (AIR) monitor circuit – low input	Wiring, AIR solenoid
P1414	Secondary air injection (AIR) monitor circuit – high input	Wiring, AIR solenoid
P1420	Catalytic converter temperature sensor	Wiring, catalytic converter temperature sensor
P1421	Catalytic converter – damage condition limit	Wiring, catalytic converter temperature sensor
P1422	Exhaust gas ignition – temperature sensor	Wiring, exhaust gas temperature sensor
P1423	Exhaust gas ignition – functional test	–
P1424	Exhaust gas ignition – primary plug	–
P1425	Exhaust gas ignition – secondary plug	–
P1426	Exhaust gas ignition – MAF sensor signal, out of range	Wiring, MAF sensor, ECM
P1427	Exhaust gas ignition – MAF sensor signal, short circuit	Wiring, MAF sensor, ECM
P1428	Exhaust gas ignition – MAF sensor signal, open circuit	Wiring, MAF sensor, ECM
P1429	Electric air pump – primary	Wiring, electric air pump
P1430	Electric air pump – secondary	Wiring, electric air pump
P1431	Misfire monitor disabled, unable to learn wheel profile	–
P1432	Engine thermostat heater – circuit malfunction	Wiring, engine thermostat heater
P1436	AC evaporator temperature sensor – voltage low	Wiring, AC evaporator temperature sensor
P1437	AC evaporator temperature sensor – voltage high	Wiring, AC evaporator temperature sensor
P1442	Evaporative emission (EVAP) system – control leak detected	Hose connection(s), fuel tank filler cap leak, EVAP canister purge valve
P1443	Evaporative emission (EVAP) control valve – low/no flow	Hose connection(s), EVAP canister purge valve
P1444	Evaporative emission (EVAP) purge flow sensor – voltage low	Wiring, EVAP purge flow sensor
P1445	Evaporative emission (EVAP) purge flow sensor – voltage high	Wiring, EVAP purge flow sensor
P1450	Evaporative emission (EVAP) system – unable to vacuum fuel tank	Hoses blocked/leaking, EVAP vacuum valve
P1451	Evaporative emission (EVAP) vent control valve – circuit malfunction	Wiring, EVAP vent control valve

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EOBD type	Fault location	Probable cause
P1452	Evaporative emission (EVAP) system – unable to vacuum fuel tank	Hoses blocked/leaking, EVAP vacuum valve
P1459	AC recirculation switch – out of self test range	Wiring, AC recirculation switch
P1460	Wide open throttle (WOT) signal (AC cut-out) – circuit malfunction	Wiring, TP switch/sensor
P1461	AC refrigerant pressure switch – voltage high	Wiring, AC refrigerant pressure switch
P1462	AC refrigerant pressure sensor – voltage low	Wiring, AC refrigerant pressure sensor
P1463	AC refrigerant pressure sensor – insufficient pressure change	Wiring, AC refrigerant pressure sensor
P1464	AC request – out of self-test range	Wiring, AC relay
P1465	AC relay – circuit malfunction	Wiring, AC relay
P1466	AC refrigerant temperature sensor – circuit malfunction	Wiring, AC refrigerant temperature sensor
P1467	AC compressor temperature sensor	Wiring, AC compressor temperature sensor
P1468	Shift solenoid (SS) open/short circuit	Wiring, SS
P1469	Rapid AC system – rapid cycling	Wiring, AC refrigerant switch/pressure sensor, AC refrigerant system fault
P1470	AC compressor clutch – cycling period too short	AC refrigerant charge high
P1473	Engine coolant blower motor – open circuit	Wiring, engine coolant blower motor, engine coolant blower motor relay
P1474	Engine coolant blower motor – control circuit malfunction	Wiring, engine coolant blower motor relay
P1477	Additional fan relay – circuit malfunction	Wiring, additional fan relay
P1478	Engine coolant blower motor – driver failure	Wiring, ECM
P1479	Engine coolant blower motor (high blower speed) – control circuit malfunction	Wiring, engine coolant blower motor relay
P1480	Engine coolant blower motor – secondary low with low fan on	–
P1481	Engine coolant blower motor (low blower speed) – with high speed fan ON	Wiring, engine coolant blower motor relay
P1482	Communication link	Wiring, ECM
P1483	Engine coolant blower motor – short circuit to earth	Wiring, engine coolant blower motor
P1484	Engine coolant blower motor – driver circuit open to positive/earth	Wiring, ECM
P1488	Exhaust silencer bypass control – circuit malfunction	Wiring, exhaust silencer bypass control solenoid
P1500	Vehicle speed sensor (VSS)	Wiring, VSS
P1501	Vehicle speed sensor (VSS) – out of self-test range	Wiring, VSS
P1502	Vehicle speed sensor (VSS) – intermittent operation	Wiring, VSS
P1503	Auxiliary speed sensor	Wiring, auxiliary speed sensor
P1504	Idle air control (IAC) valve – circuit malfunction	Wiring, IAC valve
P1505	Idle air control (IAC) system – adaptive fault	Wiring, IAC valve, intake leak



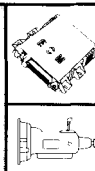
Engine management/transmission

EOBD type	Fault location	Probable cause
P1506	Idle air control (IAC) valve – over-speed error	Wiring, air leak, TP sensor, IAC valve
P1507	Idle air control (IAC) valve – under-speed error	Wiring, TP sensor, IAC valve
P1508	Idle up solenoid 1 – circuit malfunction	Wiring, idle up solenoid
P1512	Intake manifold air control solenoid, bank 1 – stuck closed	Intake manifold air control solenoid, mechanical fault
P1513	Intake manifold air control solenoid, bank 2 – stuck closed	Intake manifold air control solenoid, mechanical fault
P1516	Intake manifold air control solenoid, bank 1 – input error	Wiring, intake manifold air control solenoid, ECM
P1517	Intake manifold air control solenoid, bank 2 – input error	Intake manifold air control solenoid, mechanical fault
P1518	Intake manifold air control solenoid, bank 1 – stuck open	Intake manifold air control solenoid, mechanical fault
P1519	Intake manifold air control solenoid, bank 1 – stuck closed	Intake manifold air control solenoid, mechanical fault
P1520	Intake manifold air control solenoid – circuit malfunction	Wiring, intake manifold air control solenoid, ECM
P1530	AC compressor clutch – open circuit	Wiring, AC compressor clutch
P1531	Invalid test – accelerator pedal movement during test	Accelerator pedal movement during test
P1532	Intake manifold communication, bank 2 – control circuit malfunction	Wiring, ECM
P1533	Air assisted injector – circuit malfunction	Wiring
P1534	Restraint deployment indicator – circuit malfunction	Wiring
P1536	Handbrake warning lamp switch – circuit malfunction	Wiring, handbrake warning lamp switch
P1537	Intake manifold air control solenoid, bank 1 – stuck open	Intake manifold air control solenoid, mechanical fault
P1538	Intake manifold air control solenoid, bank 2 – stuck open	Intake manifold air control solenoid, mechanical fault
P1539	AC compressor clutch – over current/short circuit	Wiring, AC compressor clutch
P1538	Intake manifold air control solenoid – range/performance	Wiring, intake manifold air control solenoid, mechanical fault
P1542	Primary ECM ID circuit (dual ECM application)	Wiring
P1543	Engine coolant heater, A – control circuit malfunction	Wiring, engine coolant heater relay, ECM
P1544	Engine coolant heater, B – control circuit malfunction	Wiring, engine coolant heater relay, ECM
P1545	Exhaust gas recirculation (EGR) control – open circuit	Wiring, EGR solenoid, ECM
P1546	Exhaust gas recirculation (EGR) control – voltage low	Wiring, EGR solenoid, ECM
P1547	Exhaust gas recirculation (EGR) control – voltage high	Wiring, EGR solenoid, ECM
P1549	Intake manifold air control solenoid, bank 1 – control circuit malfunction	Wiring, mechanical fault, ECM

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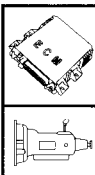
<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1550	Power steering pressure (PSP) sensor – out of self test range	Wiring, PSP sensor
P1551	Injector 1 – range/performance problem	Wiring, injector, ECM
P1552	Injector 2 – range/performance problem	Wiring, injector, ECM
P1553	Injector 3 – range/performance problem	Wiring, injector, ECM
P1554	Injector 4 – range/performance problem	Wiring, injector, ECM
P1555	Injector 5 – range/performance problem	Wiring, injector, ECM
P1556	Injector 6 – range/performance problem	Wiring, injector, ECM
P1557	Injector 7 – range/performance problem	Wiring, injector, ECM
P1558	Injector 8 – range/performance problem	Wiring, injector, ECM
P1563	Fuel injection pump – engine stop request	Wiring, fuel injection pump, ECM
P1564	Fuel injection pump – reduced fuel mode request	Wiring, fuel injection pump, ECM
P1565	Cruise control master switch – out of range, voltage high	Wiring, cruise control master switch, ECM
P1566	Cruise control master switch – out of range, voltage low	Wiring, cruise control master switch, ECM
P1567	Cruise control – output driver circuit malfunction	Wiring, cruise control actuator, ECM
P1568	Cruise control – unable to hold speed	Wiring, cruise control actuator, cruise control actuator control cable
P1572	Brake pedal position (BPP) switch – circuit malfunction	Wiring, BPP switch
P1573	Throttle position (TP) not available	–
P1574	Throttle position (TP) sensor – outputs disagree	Wiring, TP sensor
P1575	Accelerator pedal position (APP) sensor – out of self test range	Wiring, APP sensor, ECM
P1576	Accelerator pedal position (APP) sensor – not available	Wiring, APP sensor, ECM
P1577	Accelerator pedal position (APP) sensor – outputs disagree	Wiring, APP sensor, ECM
P1578	Throttle actuator control (TAC) monitor – power less than demand	Wiring, throttle body, ECM
P1579	Throttle actuator control (TAC) monitor – power limiting mode	Wiring, throttle body, ECM
P1580	Throttle actuator control (TAC) monitor – ECM override	Wiring, throttle body, ECM
P1581	Throttle actuator control (TAC) monitor – malfunction	Wiring, throttle body, ECM
P1582	Throttle actuator control (TAC) monitor – data available	Wiring, throttle body, ECM
P1583	Throttle actuator control (TAC) monitor – cruise disablement	Wiring, throttle body, ECM
P1584	Throttle actuator control (TAC) monitor – throttle body malfunction	Throttle body
P1585	Throttle actuator control (TAC) monitor – malfunction	Wiring, throttle body, ECM



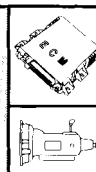


Engine management/transmission

EOBD type	Fault location	Probable cause
P1586	Throttle actuator control (TAC) monitor – communication error	Wiring, ECM
P1587	Throttle actuator control (TAC) monitor – modulated command malfunction	Wiring, throttle body, ECM
P1588	Throttle actuator control (TAC) monitor – detected loss of return spring	Throttle body
P1589	Throttle actuator control (TAC) monitor – unable to control to desired throttle angle	Wiring, throttle body, ECM
P1600	Loss of keep alive power supply	Wiring, fuses, battery
P1605	Keep alive memory – test failure	Wiring, ECM
P1608	Signal monitoring malfunction	Wiring, injection pump control module, ECM
P1609	Malfunction indicator lamp (MIL) – driver failure	Wiring, ECM
P1610	Interactive reprogramming code – replace module	ECM
P1611	Interactive reprogramming code – diagnose further	–
P1612	Interactive reprogramming code – repeat test, engine is cranking	–
P1613	Interactive reprogramming code – TBD	–
P1614	Interactive reprogramming code – TBD	–
P1615	Interactive reprogramming code – erase error	–
P1616	Interactive reprogramming code – erase error, low voltage	–
P1617	Interactive reprogramming code – block program error	–
P1618	Interactive reprogramming code – block program error, low voltage	–
P1619	Interactive reprogramming code – total checksum error	–
P1620	Interactive reprogramming code – overlay checksum error	–
P1625	Engine coolant blower motor, driver – open circuit to positive	Wiring, ECM
P1626	AC system – open circuit	Wiring
P1627	Engine control module (ECM) – supply voltage out of range	Battery, alternator
P1627	Engine control module (ECM) – supply voltage out of range	Wiring, fuses, battery, engine control relay
P1628	Engine control module (ECM) – supply voltage	Wiring, fuses, battery, engine control relay
P1629	Engine control module (ECM) – internal voltage regulator	Earth points, ECM
P1630	Engine control module (ECM) – internal reference voltage	Earth points, ECM
P1631	Engine control relay	Wiring, engine control relay
P1632	Alternator fault sensor – circuit malfunction	Alternator fault sensor
P1633	Keep alive power supply – voltage too low	Wiring, battery, alternator

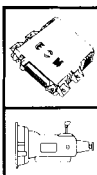
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<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1634	Data output link – circuit malfunction	Wiring
P1635	Tyre/axle out of acceptable range	Incorrect tyre size, incorrect axle ratio, ECM not programmed
P1636	Engine control module (ECM) – inductive signature chip error	ECM
P1639	Engine control module (ECM) not programmed	–
P1640	Powertrain trouble codes available in another control module	–
P1641	Fuel pump (FP) – circuit malfunction	Wiring, fuel pump relay, fuel pump (FP), ECM
P1642	Controller area network (CAN) – circuit malfunction	Wiring
P1643	Controller area network (CAN) – module network circuit error	Wiring
P1644	Fuel pump (FP) speed control – circuit malfunction	Wiring, FP control module, ECM
P1650	Power steering pressure (PSP) switch – out of self-test range	Wiring, PSP switch
P1651	Power steering pressure (PSP) switch – input	Wiring, PSP switch
P1656	Controller area network (CAN) – circuit malfunction	Wiring
P1657	Controller area network (CAN) – malfunction	Wiring, ECM
P1658	Fuel injection pump – supply voltage out of range	Wiring, engine control relay, ECM
P1659	Fuel injection pump – supply voltage	Wiring, engine control relay, ECM
P1660	Engine control module (ECM) – output check circuit – voltage high	System voltage high, ECM
P1661	Engine control module (ECM) – output check circuit – voltage high	System voltage low, ECM
P1662	ECM EN output – circuit malfunction	Wiring, fuses, engine control relay
P1663	Fuel demand – command signal output circuit malfunction	Wiring, ECM
P1664	Fuel injection pump – malfunction	Wiring, fuel injection pump, ECM
P1665	Fuel injection pump – communication	Wiring, fuel injection pump control module, ECM
P1666	Fuel injection pump – crankshaft position (CKP) sensor synchronisation	Wiring, CKP sensor, injector needle lift sensor, fuel injection pump control module, ECM
P1667	Camshaft position (CMP) sensor – circuit malfunction	Wiring, CMP sensor
P1668	Fuel injection pump – communication signal lost	Wiring, fuel injection pump control module, ECM
P1669	Fuel injection pump – monitor, mechanical fault	Wiring, fuel injection pump, ECM
P1670	Electronic feedback signal not detected	–
P1673	ABS warning lamp – control circuit malfunction	Wiring, ABS control unit, ECM
P1674	Engine control module (ECM) – software corrupted	ECM
P1690	Turbocharger (TC) wastegate regulating valve – circuit malfunction	Wiring, TC wastegate regulating valve



Engine management/transmission

EOBD type	Fault location	Probable cause
P1695	Controller area network (CAN) data bus – fuel injection pump data	Wiring, fuel injection pump control module, ECM
P1700	Transmission – neutral position fault	Wiring, transmission
P1701	Reverse gear engagement error	–
P1702	Transmission range (TR) sensor – circuit intermittent	Wiring, TR sensor
P1703	Brake pedal position (BPP) switch – out of self-test range	Wiring, BPP switch
P1704	Transmission range (TR) sensor – circuit not indicating park/neutral during self test	Wiring, TR sensor, ECM
P1705	Transmission range (TR) switch – not in P/N during self-test	Wiring, TR switch, ECM
P1706	High vehicle speed observed in park	Wiring, TR sensor, ECM
P1707	Transfer case neutral warning lamp – circuit malfunction	Wiring, neutral position switch, instruments
P1709	Park/neutral position (PNP) switch/clutch pedal position (CPP) switch – out of self-test range	Wiring, PNP switch, CPP switch, ECM
P1710	Transmission control module – solenoid/ internal earth circuit malfunction	Wiring, SS solenoid
P1711	Transmission fluid temperature (TFT) sensor – out of self test range	Wiring, TFT sensor
P1712	Transmission torque reduction system – request signal error	Wiring, TP sensor, ECM
P1713	Transmission fluid temperature (TFT) sensor – range/performance	Wiring, TFT sensor
P1714	Shift solenoid (SS) A – inductive fault	Wiring, SS, ECM
P1715	Shift solenoid (SS) B – inductive fault	Wiring, SS, ECM
P1716	Shift solenoid (SS) C – inductive fault	Wiring, SS, ECM
P1717	Shift solenoid (SS) D – inductive fault	Wiring, SS, ECM
P1718	Transmission fluid temperature (TFT) sensor – range/performance	Wiring, TFT sensor
P1725	Insufficient engine speed increase during self test	Insufficient engine speed increase during self test
P1726	Insufficient engine speed decrease during self test	Insufficient engine speed decrease during self test
P1727	Coast clutch solenoid (CCS) solenoid – inductive fault	Wiring, CCS solenoid, ECM
P1728	Transmission slip	Transmission mechanical fault
P1729	Transmission range (TR) switch (4x4) – circuit malfunction	Wiring, TR switch
P1732	Transmission shift malfunction, 2-3	Transmission mechanical fault
P1733	Transmission shift malfunction, 3-4	Transmission mechanical fault
P1734	Transmission shift malfunction, 4-5	Transmission mechanical fault
P1740	Torque converter clutch (TCC) solenoid – inductive fault	Wiring, TCC solenoid, ECM
P1741	Torque converter clutch (TCC) solenoid – control error	Wiring, TCC solenoid, ECM

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<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1742	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid, ECM
P1743	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid, ECM
P1744	Torque converter clutch (TCC) solenoid – circuit performance	Wiring, TCC solenoid, ECM
P1746	Transmission fluid pressure (TFP) control solenoid A – open circuit	Wiring, TFP control solenoid
P1747	Transmission fluid pressure (TFP) control solenoid A short circuit	Wiring, TFP control solenoid
P1748	Transmission fluid pressure (TFP) control solenoid A	Wiring, TFP control solenoid
P1749	Transmission fluid pressure (TFP) control solenoid A failed low	Wiring, TFP control solenoid
P1750	Clutch – adaptive learning not completed	–
P1754	Coast clutch solenoid (CCS) valve – circuit malfunction	Wiring, CCS valve
P1760	Transmission fluid pressure (TFP) control solenoid A – intermittent short circuit	Wiring, TFP control solenoid
P1761	Shift solenoid (SS) C – performance	Wiring, SS
P1762	Transmission overdrive band – failed Off	–
P1765	Fuel injection timing solenoid – circuit malfunction	Wiring, fuel injection timing solenoid
P1766	Shift solenoid (SS) D – performance	Wiring, SS
P1767	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid
P1768	Performance/normal/winter mode input	Wiring, transmission mode selection switch
P1769	Transmission torque modulation fault (AG4 transmission)	–
P1770	Clutch solenoid – circuit malfunction	Wiring, clutch solenoid
P1771	Shift solenoid (SS) E – performance	Wiring, SS
P1773	CAN data bus – fuel fired heater malfunction	Wiring, fuel fired heater
P1779	Transmission warning lamp – circuit malfunction	Wiring, transmission warning lamp
P1780	Transmission mode selection switch, O/D Cancel – circuit out of self test range	Wiring, transmission mode selection switch
P1781	Transmission range (TR) switch (4x4L) – out of self test range	Wiring, TR switch
P1782	Transmission mode selection switch, performance/economy – out of self test range	Wiring, transmission mode selection switch
P1783	Transmission over temperature condition	Transmission mechanical fault
P1784	Transmission mechanical failure – first and reverse	Transmission mechanical fault
P1785	Transmission mechanical failure – first and second	Transmission mechanical fault
P1786	Transmission downshift error, 3-2	–
P1787	Transmission downshift error, 2-1	–



EOBD type	Fault location	Probable cause
P1788	Transmission fluid pressure (TFP) control solenoid B open circuit	Wiring, TFP control solenoid
P1789	Transmission fluid pressure (TFP) control solenoid B short circuit	Wiring, TFP control solenoid
P1792	Barometric pressure (BARO) sensor – circuit malfunction	Wiring, BARO sensor
P1794	Engine control module (ECM) – supply voltage	Fuses, wiring, battery, alternator
P1795	CAN data bus – level inconsistent	Wiring, ECM
P1800	Transmission clutch interlock safety switch – circuit malfunction	Wiring, transmission clutch interlock safety switch, mechanical fault
P1801	Transmission clutch interlock safety switch – open circuit	Wiring, transmission clutch interlock safety switch
P1802	Transmission clutch interlock safety switch – short circuit to positive	Wiring
P1803	Transmission clutch interlock safety switch – short circuit to earth	Wiring
P1804	Transmission mode selection lamp, 4x4 high – circuit malfunction	Wiring, selection lamp, instruments, ECM
P1805	Transmission mode selection lamp, 4x4 high – open circuit	Wiring, selection lamp, instruments, ECM
P1806	Transmission mode selection lamp, 4x4 high – short circuit to positive	Wiring, selection lamp, instruments, ECM
P1807	Transmission mode selection lamp, 4x4 high – short circuit to earth	Wiring, selection lamp, instruments, ECM
P1808	Transmission mode selection lamp, 4x4 low – circuit malfunction	Wiring, selection lamp, instruments, ECM
P1809	Transmission mode selection lamp, 4x4 low – open circuit	Wiring, selection lamp, instruments, ECM
P1810	Transmission mode selection lamp, 4x4 low – short circuit to positive	Wiring, selection lamp, instruments, ECM
P1811	Transmission mode selection lamp, 4x4 low – indicator short circuit to earth	Wiring, selection lamp, instruments, ECM
P1812	Transmission mode selection switch, 4x4 – circuit malfunction	Wiring, transmission mode selection switch, ECM
P1813	Transmission mode selection switch, 4x4 – open circuit	Wiring, transmission mode selection switch, ECM
P1814	Transmission mode selection switch, 4x4 – short circuit to positive	Wiring, transmission mode selection switch, ECM
P1815	Transmission mode selection switch, 4x4 – short circuit to earth	Wiring, transmission mode selection switch, ECM
P1816	Neutral position (NP) switch – circuit malfunction	Wiring, NP switch
P1817	Neutral position (NP) switch – open circuit	Wiring, NP switch
P1818	Neutral position (NP) switch – short circuit to positive	Wiring
P1819	Neutral position (NP) switch – short circuit to earth	Wiring
P1820	Transmission system relay, transfer case clockwise shift – circuit malfunction	Wiring, shift relay

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EOBD type	Fault location	Probable cause
P1821	Transmission system relay, transfer case clockwise shift – open circuit	Wiring, shift relay
P1822	Transmission system relay, transfer case clockwise shift – short circuit to positive	Wiring, shift relay
P1823	Transmission system relay, transfer case clockwise shift – short circuit to earth	Wiring, shift relay
P1824	Transmission system relay, 4x4 clutch – circuit malfunction	Wiring, transmission system relay
P1825	Transmission system relay, 4x4 clutch – open circuit	Wiring, transmission system relay
P1826	Transmission system relay, 4x4 clutch – short circuit to battery	Wiring, transmission system relay
P1827	Transmission system relay, 4x4 low clutch – short circuit to earth	Wiring, transmission system relay
P1828	Transmission system relay, transfer case anticlockwise shift – circuit malfunction	Wiring, transmission system relay
P1829	Transmission system relay, transfer case anticlockwise shift – open circuit	Wiring, transmission system relay
P1830	Transmission system relay, transfer case anticlockwise shift – short circuit to positive	Wiring, transmission system relay
P1831	Transmission system relay, transfer case anticlockwise shift – short circuit to earth	Wiring, transmission system relay
P1832	Differential lock actuator, transfer case – circuit malfunction	Wiring, differential lock actuator
P1833	Differential lock actuator, transfer case – open circuit	Wiring, differential lock actuator
P1834	Differential lock actuator, transfer case – short circuit to positive	Wiring, differential lock actuator
P1835	Differential lock actuator, transfer case – short circuit to earth	Wiring, differential lock actuator
P1836	Transfer case front shaft speed sensor – circuit malfunction	Wiring, speed sensor
P1837	Transfer case rear shaft speed sensor – circuit malfunction	Wiring, speed sensor
P1838	Transfer case shift motor – circuit malfunction	Wiring, transfer case shift motor
P1839	Transfer case shift motor – open circuit	Wiring, transfer case shift motor
P1840	Transfer case shift motor – short circuit to positive	Wiring, transfer case shift motor
P1841	Transfer case shift motor – short circuit to earth	Wiring, transfer case shift motor
P1842	Differential lock switch, feedback – transfer case – circuit malfunction	Wiring, differential lock switch
P1843	Differential lock switch, feedback – transfer case – open circuit	Wiring, differential lock switch
P1844	Differential lock switch, feedback – transfer case – short circuit to positive	Wiring, differential lock switch
P1845	Differential lock switch, feedback – transfer case – short circuit to earth	Wiring, differential lock switch
P1846	Transfer case contact plate A circuit malfunction	Wiring, transfer case contact plate



EOBD type	Fault location	Probable cause
P1847	Transfer case contact plate A open circuit	Wiring, transfer case contact plate
P1848	Transfer case contact plate A short circuit to positive	Wiring, transfer case contact plate
P1849	Transfer case contact plate A short circuit to earth	Wiring, transfer case contact plate
P1850	Transfer case contact plate B circuit malfunction	Wiring, transfer case contact plate
P1851	Transfer case contact plate B open circuit	Wiring, transfer case contact plate
P1852	Transfer case contact plate B short circuit to positive	Wiring, transfer case contact plate
P1853	Transfer case contact plate B short circuit to earth	Wiring, transfer case contact plate
P1854	Transfer case contact plate C circuit malfunction	Wiring, transfer case contact plate
P1855	Transfer case contact plate C open circuit	Wiring, transfer case contact plate
P1856	Transfer case contact plate C short circuit to positive	Wiring, transfer case contact plate
P1857	Transfer case contact plate C short circuit to earth	Wiring, transfer case contact plate
P1858	Transfer case contact plate D circuit malfunction	Wiring, transfer case contact plate
P1859	Transfer case contact plate D open circuit	Wiring, transfer case contact plate
P1860	Transfer case contact plate D short circuit to positive	Wiring, transfer case contact plate
P1861	Transfer case contact plate D short circuit to earth	Wiring, transfer case contact plate
P1862	Transfer case contact plate – circuit malfunction	Wiring, transfer case contact plate
P1863	Transfer case contact plate – open circuit	Wiring, transfer case contact plate
P1864	Transfer case contact plate – short circuit to battery	Wiring, transfer case contact plate
P1865	Transfer case contact plate – short circuit to earth	Wiring, transfer case contact plate
P1866	Transfer case system concern – servicing required	–
P1867	Transfer case contact plate – circuit malfunction	Wiring, transfer case contact plate
P1868	Transmission mode selection lamp, 4x4 – circuit malfunction	Wiring, selection lamp, instruments, ECM
P1869	Transmission mode selection lamp, 4x4 – short circuit to positive	Wiring, selection lamp, instruments, ECM
P1870	Transmission mode selection switch, mechanical transfer case 4x4 – circuit malfunction	Wiring, transmission mode selection switch
P1871	Transmission mode selection switch, mechanical transfer case 4x4 – short circuit to positive	Wiring, transmission mode selection switch
P1872	Transmission mode selection lamp, axle lock – mechanical 4x4 – circuit malfunction	Wiring, transmission mode selection lamp
P1873	Transmission mode selection lamp, axle lock – mechanical 4x4 – short circuit to positive	Wiring, transmission mode selection lamp



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
EOBD type	Fault location	Probable cause
P1874	Transfer case hall effect sensor – circuit malfunction	Wiring, hall effect sensor
P1875	Transfer case hall effect sensor – short circuit to positive	Wiring, hall effect sensor
P1876	Transmission mode control solenoid, transfer case 2x4 – circuit malfunction	Wiring, transmission mode control solenoid
P1877	Transmission mode control solenoid, transfer case 2x4 – short circuit to positive	Wiring, transmission mode control solenoid
P1878	Transmission mode control solenoid, transfer case disengaged – circuit malfunction	Wiring, transmission mode control solenoid
P1879	Transmission mode control solenoid, transfer case disengaged – open circuit	Wiring, transmission mode control solenoid
P1880	Transmission mode control solenoid, transfer case disengaged – short circuit to positive	Wiring, transmission mode control solenoid
P1881	Engine coolant 'low' warning lamp switch – circuit malfunction	Wiring, engine coolant 'low' warning lamp switch
P1882	Engine coolant 'low' warning lamp switch – short circuit to earth	Wiring, engine coolant 'low' warning lamp switch
P1883	Engine coolant 'low' warning lamp switch – circuit malfunction	Wiring, engine coolant 'low' warning lamp switch
P1884	Engine coolant 'low' warning lamp switch – short circuit to earth	Wiring, engine coolant 'low' warning lamp switch
P1885	Transmission mode control solenoid, transfer case disengaged – short circuit to earth	Wiring, transmission mode control solenoid
P1886	Transmission – 4x4 initialization failure	–
P1889	Oil pressure pump – performance	–
P1890	Transmission 4x4 mode select, return – circuit malfunction	–
P1891	Transfer case contact plate – open circuit	Wiring, transfer case contact plate
P1892	Axle disconnect engagement solenoid – voltage high	Wiring, axle disconnect engagement solenoid
P1893	Axle disconnect engagement solenoid – voltage low	Wiring, axle disconnect engagement solenoid
P1894	Axle disconnect disengagement solenoid – voltage high	Wiring, axle disconnect disengagement solenoid
P1895	Axle disconnect disengagement solenoid – voltage low	Wiring, axle disconnect disengagement solenoid
P1896	Axle disconnect engagement position sensor – voltage high	Wiring, axle disconnect engagement position sensor
P1897	Axle disconnect engagement position sensor – voltage low	Wiring, axle disconnect engagement position sensor
P1898	Transmission mode selection lamp, axle disconnect – voltage high	Wiring, selection lamp
P1899	Transmission mode selection lamp, axle disconnect – voltage low	Wiring, selection lamp
P1900	Transmission output shaft speed sensor – circuit intermittent	Wiring, transmission output shaft speed sensor
P1901	Transmission turbine shaft speed (TSS) sensor – circuit intermittent	Wiring, TSS sensor





Engine management/transmission

EOBD type	Fault location	Probable cause
P1902	Transmission kick-down relay – control circuit malfunction	Wiring, transmission kick-down relay
P1903	Transmission kick-down relay – voltage low	Wiring, transmission kick-down relay
P1904	Transmission kick-down relay – voltage high	Wiring, transmission kick-down relay
P1905	Control module configured for end of line test mode	–
P1906	Kick-down relay (A4LD transmission) – pull on, open/short circuit	Wiring, kick-down relay
P1907	Kick-down relay (A4LD transmission) – hold, open/short circuit	Wiring, kick-down relay
P1908	Transmission fluid pressure (TFP) solenoid (A4LD transmission) – open/short circuit	Wiring, TFP solenoid
P1909	Transmission fluid temperature (TFT) sensor (A4LD transmission) – open/short circuit	Wiring, TFT sensor
P1910	Reversing lamp, control – open circuit	Wiring, reversing lamp switch
P1911	Reversing lamp, control – voltage low	Wiring, reversing lamp switch
P1912	Reversing lamp, control – voltage high	Wiring, reversing lamp switch
P1913	Sensor earth, A – open circuit	Wiring, ECM
P1914	Sensor earth, A – voltage low	Wiring, ECM
P1915	Sensor earth, A – voltage high	Wiring, ECM
P1916	Sensor earth, B – open circuit	Wiring, ECM
P1917	Sensor earth, B – voltage low	Wiring, ECM
P1918	Sensor earth, B – voltage high	Wiring, ECM
P1919	Engine coolant temperature signal, TCM	Wiring, ECT sensor
P1920	Engine speed signal, TCM	Wiring
P1921	Transmission range (TR) signal	Wiring, TR sensor/switch
P1933	Fuel level signal	Wiring, fuel gauge tank sensor
P1934	Vehicle speed signal	Wiring, VSS
P1935	Brake switch/sensor signal	Wiring, BPP switch/sensor
P1936	Clutch switch/sensor signal	Wiring, CPP switch/sensor
P1937	Fuel fired heater, control – open circuit	Wiring
P1938	Fuel fired heater, control – voltage low	Wiring
P1939	Fuel fired heater, control – voltage high	Wiring
U1021	Communication link – invalid/missing for AC clutch input	–
U1039	Communication link – invalid/missing for vehicle speed	–
U1041	Communication link – invalid/missing for vehicle speed	–
U1051	Communication link – invalid/missing for brake input	–
U1073	Communication link – invalid/missing for engine coolant fan status	–
U1075	Communication link – invalid/missing for engine oil temperature (EOT)	–

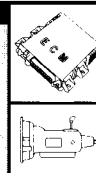
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EOBD type	Fault location	Probable cause
U1089	Communication link – invalid/missing for suspension	–
U1098	Communication link – invalid/missing for cruise control	–
U1130	Communication link – invalid/missing for fuel system	–
U1131	Communication link – invalid/missing for fuel pump (FP) status	–
U1135	Communication link – invalid/missing for ignition switch/starter	–
U1147	Communication link – invalid/missing for vehicle security	–
U1243	Communication link – invalid/missing for exterior environment	–
U1262	Communication link – bus fault	–
U1341	Communication link – invalid/missing for function read vehicle speed	–
U1451	Communication link – invalid/missing data from immobilizer control module, vehicle immobilized	Wiring, immobilizer control module
U1900	Controller area network (CAN) – bus fault	Wiring
U2023	Fault received from external node	–
U2050	No application present	–
U2051	One or more calibration files missing/corrupt	–
U2064	Warning lamp requested by another control module	–
U2195	Communication link – invalid data from steering column switches	Wiring, steering column switches



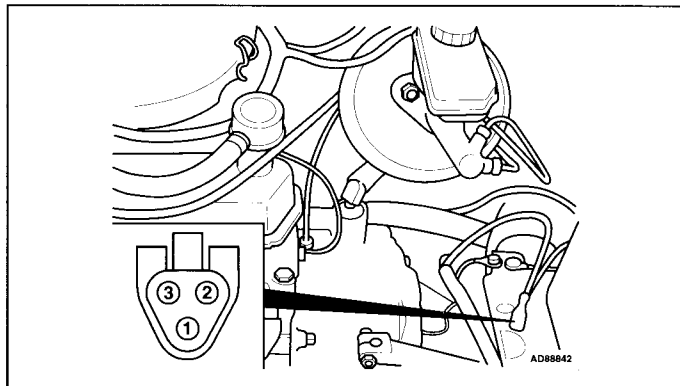
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 Year: 1987-99  
 Engine code: F4A, F4B, F6A, F6B, F6C, F6D, F6E, F6F, F6G, G6A, LHA, LJA, LJB, LJC, LJD, LJE, LJF, J6A, J6B  
 System: Ford CFI • Ford EEC IV

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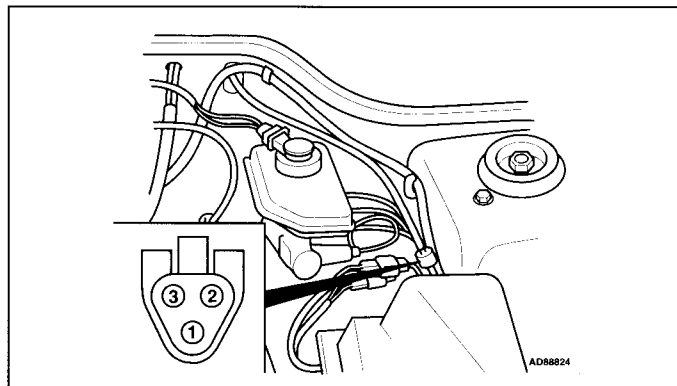


## Engine management/transmission

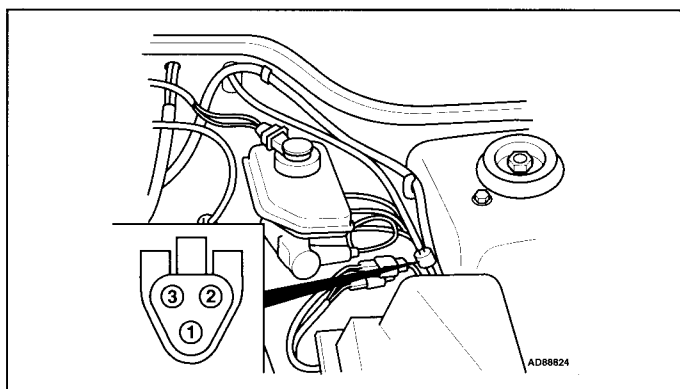
### Data link connector (DLC) locations



1,1/1,3/1,4/RS Turbo



Escort/Orion CVH



XR2i

### Trouble codes

**NOTE:** Engine control module (ECM) incorporates transmission control function.

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).

#### Accessing

- Engine at normal operating temperature.
- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 2 and 3 **1**.

- Connect LED test lamp negative connection to DLC terminal 2 **1**.
  - Connect LED test lamp positive connection to DLC terminal 1 **1**.
  - Switch ignition ON.
  - Check that LED illuminates.
  - Trouble codes are displayed after 10-25 seconds **2** [A].
  - Note trouble codes. Compare with trouble code table.
  - Trouble codes are displayed by illuminated LED switching OFF for approximately 1 second **2** [B].
  - Each trouble code consists of two groups. LED illuminates for approximately 2 seconds between each group **2** [C].
- NOTE:** Trouble codes ending in '0' are displayed with only 1 group.
- LED illuminates for approximately 5 seconds between each trouble code **2** [D].
  - For example: Trouble code 24 displayed.
  - Trouble code(s) are displayed twice.

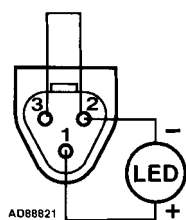


**FORD**

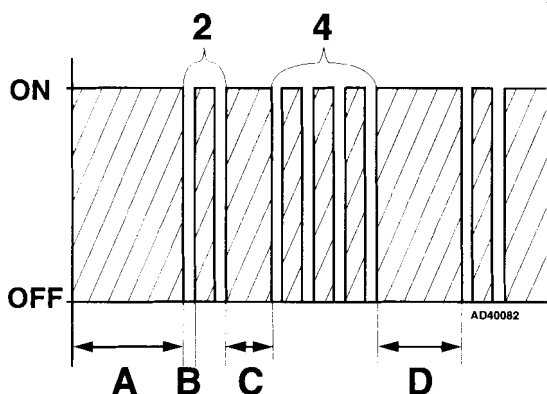
Model: Fiesta 1,1/1,3/1,4/1,6 • Escort/Orion 1,3/1,4/1,6



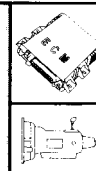
Engine management/transmission

**1****Erasing**

- Ensure ignition switched OFF.
- Disconnect engine control module (ECM) harness multi-plug.
- The engine control module (ECM) fault memory can also be erased using diagnostic equipment connected to the data link connector (DLC).

**2****Trouble code identification**

Flash type	Fault location	Probable cause
10	Command code	—
11	System pass	—
12	Volume air flow (VAF) sensor 1	Wiring, VAF sensor, air leak, air restriction, ECM
13	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
14	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
15	Throttle position (TP) sensor	Wiring, TP sensor, ECM
17	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
18	Battery voltage – low	Wiring, battery
19	Keep Alive Memory (KAM) failure	ECM
20	Separation code	—
21	Ignition signal – erratic	Wiring, CKP sensor, alternator
22	Volume air flow (VAF) sensor 1 – voltage high	Wiring, VAF sensor, ECM
23	Engine coolant temperature (ECT) sensor – voltage high	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
25	Throttle position (TP) sensor – voltage high	Wiring, TP sensor, ECM



## Engine management/transmission

Flash type	Fault location	Probable cause
27	Manifold absolute pressure (MAP) sensor – voltage high	Wiring, MAP sensor, ECM
28	Heated oxygen sensor (HO2S) – mixture rich	Wiring, fuel supply, injector control, HO2S, ECM
31	Memory failure	ECM
32	Volume air flow (VAF) sensor 1 – voltage low	Wiring, VAF sensor, ECM
33	Engine coolant temperature (ECT) sensor – voltage low	Wiring, ECT sensor, ECM
34	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
35	Throttle position (TP) sensor – voltage low	Wiring, TP sensor, ECM
36	Volume air flow (VAF) sensor 2 – voltage low	Wiring, VAF sensor, ECM
37	Manifold absolute pressure (MAP) sensor – voltage low	Wiring, MAP sensor, ECM
38	Heated oxygen sensor (HO2S) – mixture weak	Wiring, fuel supply, injector control, HO2S, ECM
41	Volume air flow (VAF) sensor 1 – signal	Wiring, VAF sensor, ECM
42	Manifold absolute pressure (MAP) sensor – signal	Wiring, MAP sensor, ECM
43	Throttle position (TP) sensor – signal	Wiring, TP sensor, ECM
44	Blip test (throttle open) not performed	–
45	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
46	Idle air control (IAC) valve – maximum engine speed	Wiring, IAC valve, ECM
47	Idle air control (IAC) valve – minimum engine speed	Wiring, IAC valve, ECM
48	Closed throttle position (CTP) switch (CFi)	Wiring, CTP switch, ECM
48	Idle air control (IAC) valve (except CFi)	Wiring, IAC valve, ECM
49	Exhaust gas recirculation (EGR) valve	Wiring, restricted/leaking EGR pipes, EGR valve, ECM
50	Identification code for engine control module (ECM)	–
51	AC 'ON' during test	–
52	AT in 'D' during test	–
53	Octane plug 1 – short circuit	–
54	Octane plug 2 – short circuit	–
55	Idle speed adjust – short circuit	–
56	Knock sensor (KS)	Wiring, fuel quality, ignition timing, KS, ECM
57	Throttle opened too early during test	–
58	Phasing of ignition pick-up/spark output signals	Wiring, CKP sensor, ignition control module (ICM), ECM
59	Mixture adjustment resistor	Wiring, air leaks, vacuum leaks, MAP sensor, mixture adjustment resistor, injectors, spark plugs
60	Start of service set mode	–
61	Power loss – cylinder 1	Compression, spark plugs
62	Power loss – cylinder 2	Compression, spark plugs
63	Power loss – cylinder 3	Compression, spark plugs
64	Power loss – cylinder 4	Compression, spark plugs

**FORD**

Model: Fiesta 1,1/1,3/1,4/1,6 • Escort/Orion 1,3/1,4/1,6

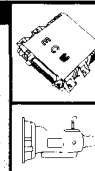
**Engine management/transmission**

Flash type	Fault location	Probable cause
65	Brake pedal position (BPP) switch – ON/OFF (DOHC)	Wiring, BPP switch, ECM
67	Fuel temperature switch	Wiring, fuel temperature switch
68	Turbocharger (TC) wastegate regulating valve	Wiring, valve, turbocharger, ECM
69	Turbocharger (TC) wastegate regulating valve	Wiring, valve, turbocharger, ECM
70	End of service set mode	–
71	Secondary air injection (AIR) solenoid	Wiring, AIR solenoid, blocked/leaking pipes, ECM
72	Exhaust gas recirculation (EGR) solenoid – EFi	Wiring, blocked/leaking pipes, EGR solenoid, ECM
72	Turbocharger (TC) wastegate regulating valve	Wiring, TC wastegate regulating valve, blocked/leaking pipes, ECM
73	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
74	Fuel pump	Wiring, fuel pump relay, fuel pump, ECM
75	Torque converter clutch (TCC) lock-up solenoid	Wiring, lock-up solenoid, transmission fault, ECM
76	Brake pedal position (BPP) switch – AT	Wiring, BPP switch, brake pedal, ECM
77	Kickdown actuated	–
78	Power steering pressure (PSP) switch – not activated	Wiring, PSP switch, power steering pump, power steering system pressure, ECM
81	Exhaust gas recirculation (EGR) solenoid	Wiring, blocked/leaking pipes, EGR solenoid, ECM
82	Exhaust gas recirculation (EGR) backpressure transducer – voltage below minimum	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
83	Exhaust gas recirculation (EGR) backpressure transducer – voltage high	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
84	Exhaust gas recirculation (EGR) backpressure transducer – voltage low	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
91	Heated oxygen sensors (HO2S) – multi-plugs interchanged	Wiring, multi-plugs



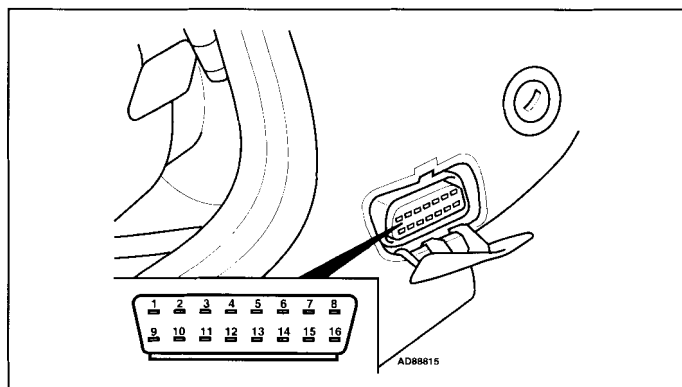
Model: Fiesta 1,3/1,4 • Escort 1,3/1,4  
 Year: 1995-96  
 Engine code: F6B, F6D, F6E, F6F, F6G, G6A, J6A, J6B  
 System: Ford CFI

**FORD**



Engine management/transmission

## Data link connector (DLC) locations



CFI

## Trouble codes

**NOTE:** Engine control module (ECM) incorporates transmission control function.

### General information

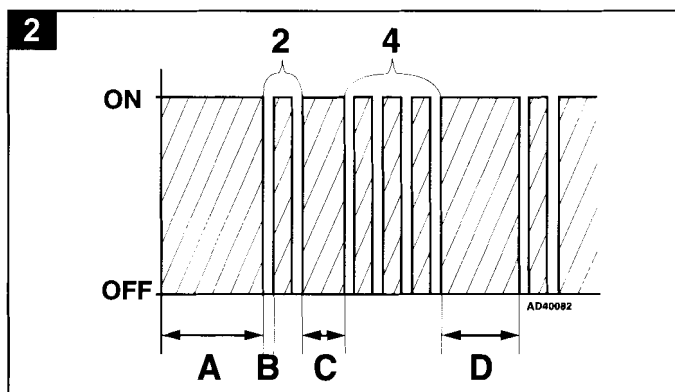
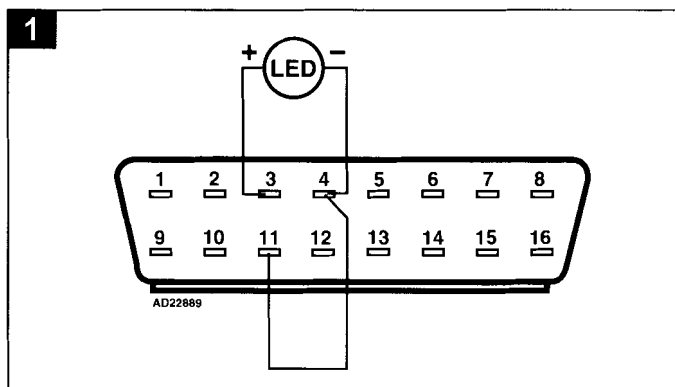
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).

### Accessing

- Engine at normal operating temperature.
- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 4 and 11 **1**.
- Connect LED test lamp negative connection to DLC terminal 4 **1**.
- Connect LED test lamp positive connection to DLC terminal 3 **1**.
- Switch ignition ON.
- Check that LED illuminates.
- Trouble codes are displayed after 10-25 seconds **2** [A].
- Note trouble codes. Compare with trouble code table.
- Trouble codes are displayed by illuminated LED switching OFF for approximately 1 second **2** [B].
- Each trouble code consists of two groups. LED illuminates for approximately 2 seconds between each group **2** [C].

**NOTE:** Trouble codes ending in '0' are displayed with only 1 group.

- LED illuminates for approximately 5 seconds between each trouble code **2** [D].
- Trouble code(s) are displayed twice.



### Erasing

- Ensure ignition switched OFF.
- Disconnect engine control module (ECM) harness multi-plug.
- The engine control module (ECM) fault memory can also be erased using diagnostic equipment connected to the data link connector (DLC).

**FORD**

Model: Fiesta 1,3/1,4 • Escort 1,3/1,4

Engine management/transmission

**Trouble code identification**

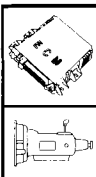
Flash type	Fault location	Probable cause
10	Command code	–
11	System pass	–
12	Volume air flow (VAF) sensor 1	Wiring, VAF sensor, air leak, air restriction, ECM
13	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
14	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
15	Throttle position (TP) sensor	Wiring, TP sensor, ECM
17	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
18	Battery voltage – low	Wiring, battery
19	Keep Alive Memory (KAM) failure	ECM
20	Separation code	–
21	Ignition signal – erratic	Wiring, CKP sensor, alternator
22	Volume air flow (VAF) sensor 1 – voltage high	Wiring, VAF sensor, ECM
23	Engine coolant temperature (ECT) sensor – voltage high	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
25	Throttle position (TP) sensor – voltage high	Wiring, TP sensor, ECM
27	Manifold absolute pressure (MAP) sensor – voltage high	Wiring, MAP sensor, ECM
28	Heated oxygen sensor (HO2S) – mixture rich	Wiring, fuel supply, injector control, HO2S, ECM
31	Memory failure	ECM
32	Volume air flow (VAF) sensor 1 – voltage low	Wiring, VAF sensor, ECM
33	Engine coolant temperature (ECT) sensor – voltage low	Wiring, ECT sensor, ECM
34	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
35	Throttle position (TP) sensor – voltage low	Wiring, TP sensor, ECM
36	Volume air flow (VAF) sensor 2 – voltage low	Wiring, VAF sensor, ECM
37	Manifold absolute pressure (MAP) sensor – voltage low	Wiring, MAP sensor, ECM
38	Heated oxygen sensor (HO2S) – mixture weak	Wiring, fuel supply, injector control, HO2S, ECM
41	Volume air flow (VAF) sensor 1 – signal	Wiring, VAF sensor, ECM
42	Manifold absolute pressure (MAP) sensor – signal	Wiring, MAP sensor, ECM
43	Throttle position (TP) sensor – signal	Wiring, TP sensor, ECM
44	Blip test (throttle open) not performed	–
45	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
46	Idle air control (IAC) valve – maximum engine speed	Wiring, IAC valve, ECM
47	Idle air control (IAC) valve – minimum engine speed	Wiring, IAC valve, ECM
48	Closed throttle position (CTP) switch	Wiring, CTP switch, ECM
49	Exhaust gas recirculation (EGR) valve	Wiring, restricted/leaking EGR pipes, EGR valve, ECM
50	Identification code for engine control module (ECM)	–
51	AC 'ON' during test	–





Flash type	Fault location	Probable cause
52	AT in 'D' during test	–
53	Octane plug 1 – short circuit	–
54	Octane plug 2 – short circuit	–
55	Idle speed adjust – short circuit	–
56	Knock sensor (KS)	Wiring, fuel quality, ignition timing, KS, ECM
57	Throttle opened too early during test	–
58	Phasing of ignition pick-up/spark output signals	Wiring, CKP sensor, ignition control module (ICM), ECM
59	Mixture adjustment resistor	Wiring, air leaks, vacuum leaks, MAP sensor, mixture adjustment resistor, injectors, spark plugs
60	Start of service set mode	–
61	Power loss – cylinder 1	Compression, spark plugs
62	Power loss – cylinder 2	Compression, spark plugs
63	Power loss – cylinder 3	Compression, spark plugs
64	Power loss – cylinder 4	Compression, spark plugs
65	Brake pedal position (BPP) switch – ON/OFF (DOHC)	Wiring, BPP switch, ECM
67	Fuel temperature switch	Wiring, fuel temperature switch
68	Turbocharger (TC) wastegate regulating valve	Wiring, valve, turbocharger, ECM
69	Turbocharger (TC) wastegate regulating valve	Wiring, valve, turbocharger, ECM
70	End of service set mode	–
71	Secondary air injection (AIR) solenoid	Wiring, AIR solenoid, blocked/leaking pipes, ECM
72	Exhaust gas recirculation (EGR) solenoid – EFI	Wiring, blocked/leaking pipes, EGR solenoid, ECM
72	Turbocharger (TC) wastegate regulating valve	Wiring, TC wastegate regulating valve, blocked/leaking pipes, ECM
73	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
74	Fuel pump	Wiring, fuel pump relay, fuel pump, ECM
75	Torque converter clutch (TCC) lock-up solenoid	Wiring, lock-up solenoid, transmission fault, ECM
76	Brake pedal position (BPP) switch – AT	Wiring, BPP switch, brake pedal, ECM
77	Kickdown actuated	–
78	Power steering pressure (PSP) switch – not activated	Wiring, PSP switch, power steering pump, power steering system pressure, ECM
81	Exhaust gas recirculation (EGR) solenoid	Wiring, blocked/leaking pipes, EGR solenoid, ECM
82	Exhaust gas recirculation (EGR) backpressure transducer – voltage below minimum	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
83	Exhaust gas recirculation (EGR) backpressure transducer – voltage high	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
84	Exhaust gas recirculation (EGR) backpressure transducer – voltage low	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
91	Heated oxygen sensors (HO2S) – multi-plugs interchanged	Wiring, multi-plugs

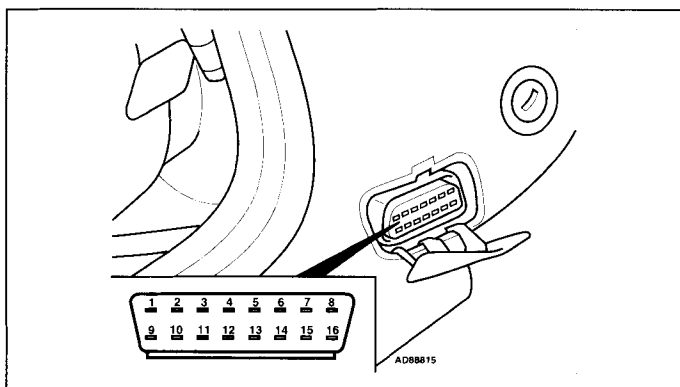


**FORD**

Model: Fiesta 1,4 • Escort 1,4  
Year: 1995-99  
Engine code: F4A, F4B  
System: Ford EEC IV

## Engine management/transmission

### Data link connector (DLC) locations



Fiesta/Escort

### Trouble codes

**NOTE:** Engine control module (ECM) incorporates transmission control function.

#### General information

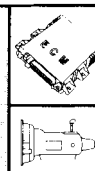
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- The ECM fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

Flash type	Fault location	Probable cause
10	Command code	—
11	System pass	—
12	Volume air flow (VAF) sensor 1	Wiring, VAF sensor, air leak, air restriction, ECM
13	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
14	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
15	Throttle position (TP) sensor	Wiring, TP sensor, ECM
17	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
18	Battery voltage – low	Wiring, battery



Flash type	Fault location	Probable cause
19	Keep Alive Memory (KAM) failure	ECM
20	Separation code	–
21	Ignition signal – erratic	Wiring, CKP sensor, alternator
22	Volume air flow (VAF) sensor 1 – voltage high	Wiring, VAF sensor, ECM
23	Engine coolant temperature (ECT) sensor – voltage high	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
25	Throttle position (TP) sensor – voltage high	Wiring, TP sensor, ECM
27	Manifold absolute pressure (MAP) sensor – voltage high	Wiring, MAP sensor, ECM
28	Heated oxygen sensor (HO2S) – mixture rich	Wiring, fuel supply, injector control, HO2S, ECM
31	Memory failure	ECM
32	Volume air flow (VAF) sensor 1 – voltage low	Wiring, VAF sensor, ECM
33	Engine coolant temperature (ECT) sensor – voltage low	Wiring, ECT sensor, ECM
34	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
35	Throttle position (TP) sensor – voltage low	Wiring, TP sensor, ECM
36	Volume air flow (VAF) sensor 2 – voltage low	Wiring, VAF sensor, ECM
37	Manifold absolute pressure (MAP) sensor – voltage low	Wiring, MAP sensor, ECM
38	Heated oxygen sensor (HO2S) – mixture weak	Wiring, fuel supply, injector control, HO2S, ECM
41	Volume air flow (VAF) sensor 1 – signal	Wiring, VAF sensor, ECM
42	Manifold absolute pressure (MAP) sensor – signal	Wiring, MAP sensor, ECM
43	Throttle position (TP) sensor – signal	Wiring, TP sensor, ECM
44	Blip test (throttle open) not performed	–
45	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
46	Idle air control (IAC) valve – maximum engine speed	Wiring, IAC valve, ECM
47	Idle air control (IAC) valve – minimum engine speed	Wiring, IAC valve, ECM
48	Idle air control (IAC) valve	Wiring, IAC valve, ECM
49	Exhaust gas recirculation (EGR) valve	Wiring, restricted/leaking EGR pipes, EGR valve, ECM
50	Identification code for engine control module (ECM)	–
51	AC 'ON' during test	–
52	AT in 'D' during test	–
53	Octane plug 1 – short circuit	–
54	Octane plug 2 – short circuit	–
55	Idle speed adjust – short circuit	–
56	Knock sensor (KS)	Wiring, fuel quality, ignition timing, KS, ECM
57	Throttle opened too early during test	–
58	Phasing of ignition pick-up/spark output signals	Wiring, CKP sensor, ignition control module (ICM), ECM



**FORD**

Model: Fiesta 1,4 • Escort 1,4

**Engine management/transmission**

Flash type	Fault location	Probable cause
59	Mixture adjustment resistor	Wiring, air leaks, vacuum leaks, MAP sensor, mixture adjustment resistor, injectors, spark plugs
60	Start of service set mode	–
61	Power loss – cylinder 1	Compression, spark plugs
62	Power loss – cylinder 2	Compression, spark plugs
63	Power loss – cylinder 3	Compression, spark plugs
64	Power loss – cylinder 4	Compression, spark plugs
65	Brake pedal position (BPP) switch – ON/OFF (DOHC)	Wiring, BPP switch, ECM
67	Fuel temperature switch	Wiring, fuel temperature switch
68	Turbocharger (TC) wastegate regulating valve	Wiring, valve, turbocharger, ECM
69	Turbocharger (TC) wastegate regulating valve	Wiring, valve, turbocharger, ECM
70	End of service set mode	–
71	Secondary air injection (AIR) solenoid	Wiring, AIR solenoid, blocked/leaking pipes, ECM
72	Exhaust gas recirculation (EGR) solenoid – EFi	Wiring, blocked/leaking pipes, EGR solenoid, ECM
72	Turbocharger (TC) wastegate regulating valve	Wiring, TC wastegate regulating valve, blocked/leaking pipes, ECM
73	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
74	Fuel pump	Wiring, fuel pump relay, fuel pump, ECM
75	Torque converter clutch (TCC) lock-up solenoid	Wiring, lock-up solenoid, transmission fault, ECM
76	Brake pedal position (BPP) switch – AT	Wiring, BPP switch, brake pedal, ECM
77	Kickdown actuated	–
78	Power steering pressure (PSP) switch – not activated	Wiring, PSP switch, power steering pump, power steering system pressure, ECM
81	Exhaust gas recirculation (EGR) solenoid	Wiring, blocked/leaking pipes, EGR solenoid, ECM
82	Exhaust gas recirculation (EGR) backpressure transducer – voltage below minimum	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
83	Exhaust gas recirculation (EGR) backpressure transducer – voltage high	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
84	Exhaust gas recirculation (EGR) backpressure transducer – voltage low	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
91	Heated oxygen sensors (HO2S) – multi-plugs interchanged	Wiring, multi-plugs



Model: Fiesta 1,6/1,8 16V • Escort/Orion 1,6/1,8 16V  
 Mondeo 1,6/1,8/2,0 16V • Mondeo 2,5 V6  
 Granada/Scorpio 2,9 V6 24V

Year: 1991-95

Engine code: BOA, L1E, L1F, L1G, LIH, LIJ, NGA, RDA, RDB,  
 RKA, RKB, RQB, RQC, SEA

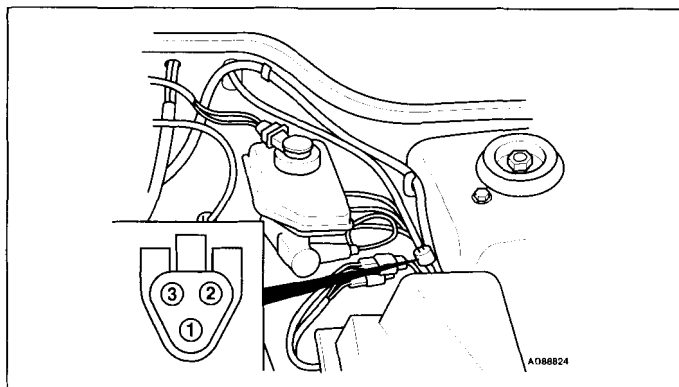
System: Ford EEC IV

**FORD**

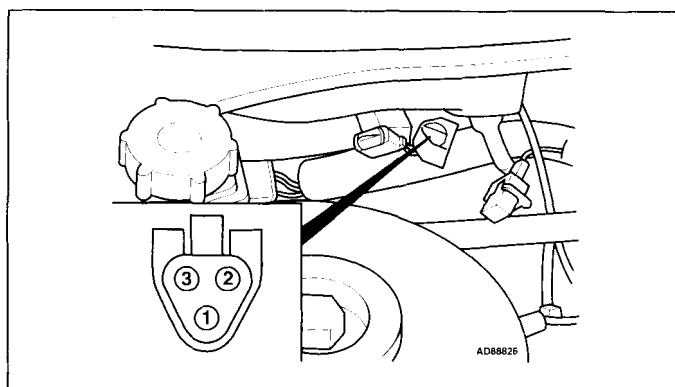


## Engine management/transmission

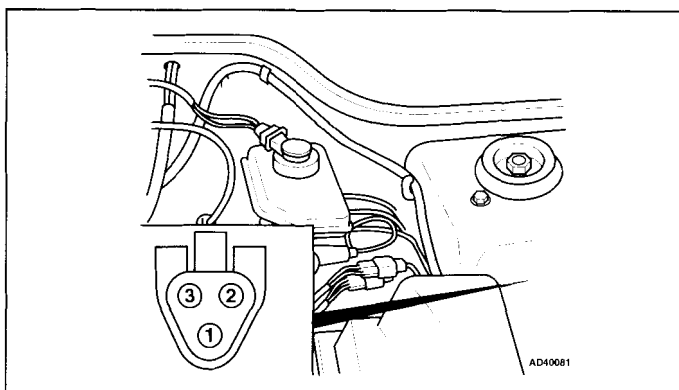
### Data link connector (DLC) locations



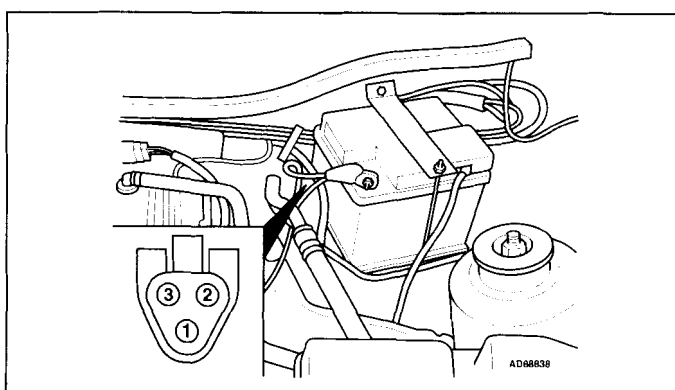
Fiesta



Mondeo



Escort/Orion



Granada/Scorpio

### Trouble codes

**NOTE:** Engine control module (ECM) incorporates transmission control function.

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).

#### Accessing

- Engine at normal operating temperature.
- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 2 and 3 **1**.
- Connect LED test lamp negative connection to DLC terminal 2 **1**.
- Connect LED test lamp positive connection to DLC terminal 1 **1**.
- Switch ignition ON.
- Check that LED illuminates.
- Note trouble codes. Compare with trouble code table.
- Trouble codes are displayed by illuminated LED switching OFF for approximately 0,5 second **2** [A].

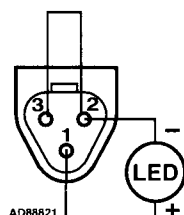
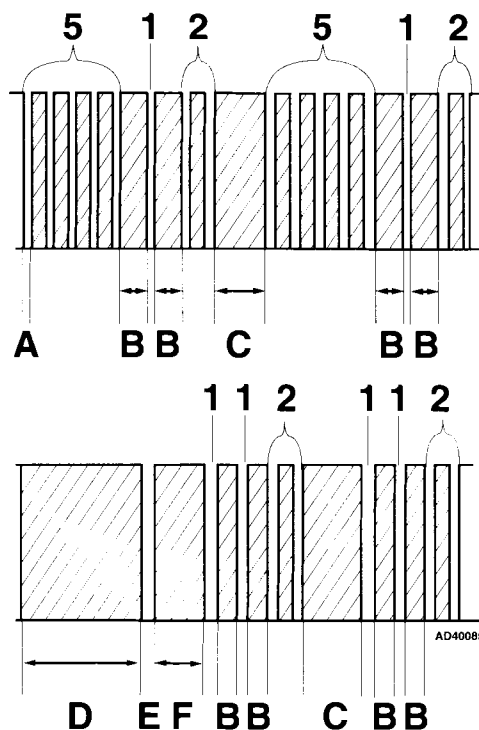
**FORD**Model: Fiesta 1,6/1,8 16V • Escort/Orion 1,6/1,8 16V • Mondeo 1,6/1,8/2,0 16V  
Mondeo 2,5 V6 • Granada/Scorpio 2,9 V6 24V**Engine management/transmission**

- Each trouble code consists of three groups. LED illuminates for approximately 1,5 seconds between each group **2** [B].
- LED illuminates for approximately 3 seconds between each trouble code **2** [C].

**NOTE:** Trouble codes ending in '0' are displayed with only one group.

- Engine control module (ECM) is equipped with two fault memories.
- Each fault memory output is separated by the following:
  - LED illuminates for approximately 7 seconds **2** [D].
  - LED extinguishes for 0,5 seconds (separation code) **2** [E].
  - LED illuminates for approximately 4,5 seconds **2** [F].
- Start of next fault memory trouble code output.

**NOTE:** Trouble code output of first fault memory is displayed twice. Then trouble code output of second fault memory is displayed twice.

**1****2****Erasing**

- Ensure ignition switched OFF.
- Disconnect engine control module (ECM) harness multi-plug.

**Trouble code identification**

System code	Code meaning	Action
010	Separator/command code	Briefly depress accelerator pedal fully
020	Command code	Briefly depress brake pedal fully
030	Command code	Briefly depress brake pedal fully

Flash type	Fault location	Probable cause
10	Cylinder 1, low	Cylinder compression, ignition components, injector
20	Cylinder 2, low	Cylinder compression, ignition components, injector
30	Cylinder 3, low	Cylinder compression, ignition components, injector
40	Cylinder 4, low	Cylinder compression, ignition components, injector
50	Cylinder 5, low	Cylinder compression, ignition components, injector



Flash type	Fault location	Probable cause
60	Cylinder 6, low	Cylinder compression, ignition components, injector
90	Cylinder balance test OK	–
111	Systems OK	–
112	Intake air temperature (IAT) sensor – voltage low	Wiring, IAT sensor, ECM
113	Intake air temperature (IAT) sensor – voltage high	Wiring, IAT sensor, ECM
114	Intake air temperature (IAT) sensor – range	IAT sensor
116	Engine coolant temperature (ECT) sensor – range	ECT sensor
117	Engine coolant temperature (ECT) sensor – voltage low	Wiring, ECT sensor, ECM
118	Engine coolant temperature (ECT) sensor – voltage high	Wiring, ECT sensor, ECM
121	Throttle position (TP) switch/sensor – range	TP switch/sensor
122	Throttle position (TP) switch/sensor – voltage low	Wiring, TP switch/sensor, ECM
123	Throttle position (TP) switch/sensor – voltage high	Wiring, TP switch/sensor, ECM
124	Throttle position (TP) switch/sensor – voltage high	Wiring, TP switch/sensor, ECM
125	Throttle position (TP) switch/sensor – voltage low	Wiring, TP switch/sensor, ECM
129	Mass air flow (MAF) sensor/manifold absolute pressure (MAP) sensor – no signal change during throttle 'blip'	Mass air flow (MAF) sensor/manifold absolute pressure (MAP) sensor
136	Heated oxygen sensor (HO2S) 2, bank 2 – weak mixture	Wiring, HO2S, ECM
137	Heated oxygen sensor (HO2S) 2, bank 2 – rich mixture	Wiring, HO2S, ECM
139	Heated oxygen sensor (HO2S) 2, bank 2 – weak/rich mixture	Wiring, HO2S, ECM
144	Heated oxygen sensor (HO2S) 1, bank 1 – weak/rich mixture	Wiring, HO2S, ECM
157	Mass air flow (MAF) sensor – voltage low	Wiring, MAF sensor, ECM
158	Mass air flow (MAF) sensor – voltage high	Wiring, MAF sensor, ECM
159	Mass air flow (MAF) sensor – range	Wiring, MAF sensor, ECM
167	Throttle position (TP) switch/sensor – no signal change during throttle 'blip'	TP switch/sensor
171	Heated oxygen sensor (HO2S) 1, bank 1 – adaptive limit reached	Fuel pressure, wiring, air leaks, injectors, ECM
172	Heated oxygen sensor (HO2S) 1, bank 1 – weak mixture	Wiring, HO2S, ECM
173	Heated oxygen sensor (HO2S) 1, bank 1 – rich mixture	Wiring, HO2S, ECM
174	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
175	Heated oxygen sensor (HO2S) 2, bank 2 – adaptive limit reached	Fuel pressure, wiring, air leaks, injectors, ECM
176	Heated oxygen sensor (HO2S) 2, bank 2 – weak mixture	Wiring, HO2S, ECM
177	Heated oxygen sensor (HO2S) 2, bank 2 – rich mixture	Wiring, HO2S, ECM
178	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
179	Fuel trim (part throttle) – weak mixture	Fuel pressure, air leaks, injectors, ignition system
181	Fuel trim (part throttle) – rich mixture	Fuel pressure, air leaks, injectors, ignition system
182	Fuel trim (idle) – weak mixture	Fuel pressure, air leaks, injectors, ignition system

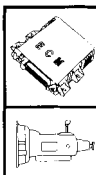
**FORD**Model: Fiesta 1,6/1,8 16V • Escort/Orion 1,6/1,8 16V • Mondeo 1,6/1,8/2,0 16V  
Mondeo 2,5 V6 • Granada/Scorpio 2,9 V6 24V**Engine management/transmission**

Flash type	Fault location	Probable cause
183	Fuel trim (idle) – rich mixture	Fuel pressure, air leaks, injectors, ignition system
184	Mass air flow (MAF) sensor – air flow high	Wiring, MAF sensor, ECM
185	Mass air flow (MAF) sensor – air flow low	Wiring, MAF sensor, ECM
186	Injector pulse width – too long	Wiring, injectors, ECM
187	Injector pulse width – too short	Wiring, injectors, ECM
188	Heated oxygen sensor (HO2S), bank 2 – weak mixture	Wiring, fuel pressure, injectors, air leak, HO2S, ECM
189	Heated oxygen sensor (HO2S), bank 2 – rich mixture	Wiring, fuel pressure, injectors, air leak, HO2S, ECM
191	Heated oxygen sensor (HO2S), bank 2 – idle mixture weak	Wiring, fuel pressure, injectors, air leak, HO2S, ECM
192	Heated oxygen sensor (HO2S), bank 1 – idle mixture rich	Wiring, fuel pressure, injectors, air leak, HO2S, ECM
194	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
195	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
211	Profile ignition pick-up (PIP) signal	Wiring, CKP sensor, ignition control (EDIS) module, ECM
212	Tachometer circuit	Wiring, ignition control (EDIS) module, tachometer
213	Spark output (SPOUT) signal	Wiring, ignition control (EDIS) module, ECM
214	Camshaft position (CMP) sensor – circuit malfunction	Wiring, CMP sensor, ECM
215	Ignition coil 1, EDIS	Ignition coil
216	Ignition coil 2, EDIS	Ignition coil
217	Ignition coil 3, EDIS	Ignition coil
218	Tachometer circuit	Wiring, ignition control (EDIS) module, tachometer
222	Tachometer circuit	Wiring, ignition control (EDIS) module, tachometer
226	Ignition control (EDIS) module – pulse missing	Wiring, ignition control (EDIS) module, CKP/RPM sensor, ECM
227	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Wiring, CKP/RPM sensor
228	Ignition control (EDIS) module/ignition coil 1	Wiring, ignition control (EDIS) module, ignition coil
229	Ignition control (EDIS) module/ignition coil 2	Wiring, ignition control (EDIS) module, ignition coil
231	Ignition control (EDIS) module/ignition coil 3	Wiring, ignition control (EDIS) module, ignition coil
232	Ignition coil primary circuit	Wiring, ignition coil
233	Ignition control (EDIS) module	Ignition control (EDIS) module
234	Ignition coil	Ignition coil
235	Ignition coil	Ignition coil
236	Ignition coil	Ignition coil
237	Ignition coil	Ignition coil





Flash type	Fault location	Probable cause
238	Ignition control (EDIS) module/ignition coil	Wiring, ignition control (EDIS) module, ignition coil
239	Profile ignition pick-up (PIP) signal – PIP signal occurs when engine cranking	Wiring, CKP/RPM sensor, ignition control (EDIS) module, ECM
241	Engine control module (ECM)/ignition control (EDIS) module – false data	Engine control module (ECM), ignition control (EDIS) module
243	Ignition coil	Ignition coil
311	Pulsed secondary air injection (PAIR) system	Wiring, PAIR solenoid, MAP/MAF/VAF sensor, ECM
312	Pulsed secondary air injection (PAIR) system	Wiring, PAIR solenoid, MAP/MAF/VAF sensor, ECM
313	Pulsed secondary air injection (PAIR) system	Wiring, PAIR solenoid, MAP/MAF/VAF sensor, ECM
314	Pulsed secondary air injection (PAIR) system	Wiring, PAIR solenoid, MAP/MAF/VAF sensor, ECM
315	Pulsed secondary air injection (PAIR) system	Wiring, PAIR solenoid, MAP/MAF/VAF sensor, ECM
316	Pulsed secondary air injection (PAIR) system	Wiring, PAIR solenoid, MAP/MAF/VAF sensor, ECM
326	Exhaust pressure (EP) sensor	Wiring, EP sensor, ECM
327	Exhaust pressure (EP) sensor/exhaust gas recirculation (EGR) solenoid	Wiring, EP sensor, EGR solenoid, ECM
328	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid, ECM
332	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid, ECM
334	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid, ECM
335	Exhaust pressure (EP) sensor	Wiring, EP sensor, ECM
336	Exhaust pressure (EP) – high	EP sensor
337	Exhaust pressure (EP) sensor/exhaust gas recirculation (EGR) solenoid	Wiring, EP sensor, EGR solenoid, ECM
338	Engine coolant temperature (ECT) sensor – temperature low	Wiring, ECT sensor, ECM
339	Engine coolant temperature (ECT) sensor – temperature high	Wiring, ECT sensor, ECM
341	Octane plug – connected to earth	Octane plug
411	Engine rpm too low during self-test	Wiring, compression, ignition, IAC valve, ECM
412	Engine rpm too high during self-test	Wiring, compression, ignition, IAC valve, ECM
413	Idle air control (IAC) valve	Wiring, IAC valve, ECM
414	Idle air control (IAC) valve	Wiring, IAC valve, ECM
415	Idle air control (IAC) valve	Wiring, IAC valve, ECM
416	Idle air control (IAC) valve	Wiring, IAC valve, ECM
452	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
511	Engine control module (ECM) – ROM error	ECM
512	Engine control module (ECM) – KAM error	ECM
513	Engine control module (ECM) – internal reference voltage	ECM

**FORD**Model: Fiesta 1,6/1,8 16V • Escort/Orion 1,6/1,8 16V • Mondeo 1,6/1,8/2,0 16V  
Mondeo 2,5 V6 • Granada/Scorpio 2,9 V6 24V**Engine management/transmission**

Flash type	Fault location	Probable cause
519	Power steering pressure (PSP) switch – not activated during self-test	Wiring, PSP switch
521	Power steering pressure (PSP) switch – not activated	Wiring, PSP switch
522	Park/neutral position (PNP) switch – circuit malfunction	Wiring, PNP switch, ECM
523	Park/neutral position (PNP) switch – circuit malfunction	Wiring, PNP switch, ECM
528	Clutch pedal position (CPP) switch – circuit malfunction	Wiring, CPP switch, ECM
536	Brake pedal position (BPP) switch – not activated during self-test	Wiring, BPP switch, ECM
538	Operator error during self-test	–
539	AC switched ON during self-test	Wiring, AC switch
542	Fuel pump – circuit malfunction	Wiring, fuel pump relay, IFS switch
543	Fuel pump – circuit malfunction	Wiring, fuel pump relay, IFS switch
551	Idle air control (IAC) valve – circuit malfunction	Wiring, IAC valve, ECM
552	Pulsed secondary air injection (PAIR) system – circuit malfunction	Wiring, PAIR solenoid
556	Fuel pump – circuit malfunction	Wiring, fuel pump relay
558	Exhaust gas recirculation (EGR) solenoid – circuit malfunction	Wiring, EGR solenoid, ECM
563	Engine coolant blower motor relay – circuit malfunction	Wiring, engine coolant blower motor relay
564	Engine coolant blower motor relay – circuit malfunction	Wiring, engine coolant blower motor relay
565	Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring, EVAP canister purge valve, ECM
566	3rd/4th gear shift solenoid	Wiring, 3rd/4th gear shift solenoid
573	Engine coolant blower motor relay – circuit malfunction	Wiring, engine coolant blower motor relay, ECM
574	Engine coolant blower motor relay – circuit malfunction	Wiring, engine coolant blower motor relay, ECM
575	Fuel pump/inertia fuel shut-off (IFS) switch – circuit	Wiring, fuel pump relay, IFS switch
576	Kick-down switch	Wiring, kick-down switch
577	Kick-down switch – not activated during self-test	Wiring, kick-down switch
612	Transmission range (TR) switch, 4th/3rd gear switch contacts – open circuit	Wiring, TR switch
613	Transmission range (TR) switch, 4th/3rd gear circuit – open circuit	Wiring, TR switch
614	Transmission range (TR) switch, 3rd/2nd gear circuit – short circuit	Wiring, TR switch
615	Transmission range (TR) switch, 3rd/2nd gear switch contacts – open circuit	Wiring, TR switch
621	Shift solenoid (SS) 1 – circuit malfunction	Wiring, shift solenoid, ECM
622	Shift solenoid (SS) 2 – circuit malfunction	Wiring, shift solenoid, ECM
624	AT electronic pressure control solenoid	AT electronic pressure control solenoid
625	AT electronic pressure control solenoid – circuit malfunction	Wiring, AT electronic pressure control solenoid, ECM
628	Modulated torque converter clutch (TCC) solenoid	Wiring, TCC solenoid
629	Torque converter clutch (TCC) solenoid	Wiring, TCC solenoid
634	Park/neutral position (PNP) switch	Wiring, PNP switch
635	Transmission fluid temperature (TFT) switch – circuit malfunction	Wiring, TFT switch, ECM
636	Transmission fluid temperature (TFT) switch – circuit malfunction	Wiring, TFT switch, ECM

Model: Fiesta 1,6/1,8 16V • Escort/Orion 1,6/1,8 16V • Mondeo 1,6/1,8/2,0 16V  
Mondeo 2,5 V6 • Granada/Scorpio 2,9 V6 24V

**FORD**

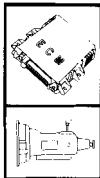


## Engine management/transmission



Flash type	Fault location	Probable cause
637	Transmission fluid temperature (TFT) switch – circuit malfunction	Wiring, TFT switch, ECM
638	Transmission fluid temperature (TFT) switch – circuit malfunction	Wiring, TFT switch, ECM
639	Turbine shaft speed (TSS) sensor – signal low	Wiring, TSS sensor
645	1st gear failure – incorrect ratio	Wiring, transmission fault
646	2nd gear failure – incorrect ratio	Wiring, transmission fault
647	3rd gear failure – incorrect ratio	Wiring, transmission fault
648	4th gear failure – incorrect ratio	Wiring, transmission fault
649	Electronic throttle valve – failure	Wiring, electronic throttle valve, ECM
651	Electronic throttle valve – intermittent failure	Wiring, electronic throttle valve, ECM
652	Modulated torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid, ECM
653	Transmission control switch – not activated during self-test	Wiring, transmission control switch, ECM
658	Performance/economy switch – not activated during self-test	Wiring, performance/economy switch, ECM
998	ECT sensor/IAT sensor/MAF sensor/TP sensor – circuit malfunction	Wiring, ECT sensor/IAT sensor/MAF sensor/TP sensor, ECM





# FORD

Model: Fiesta 1,6/1,8 16V • Escort 1,6/1,8 16V  
Mondeo 1,6/1,8/2,0 16V • Mondeo 2,5 V6

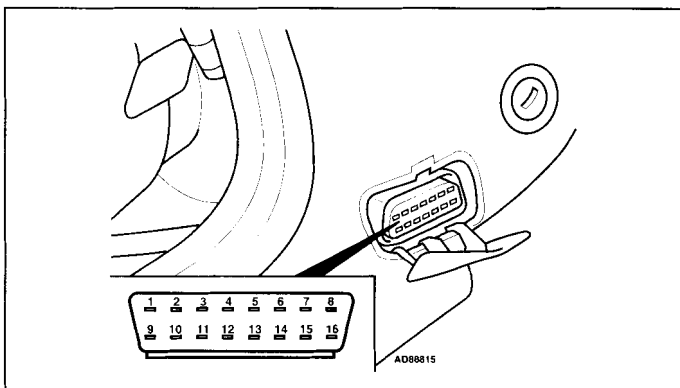
Year: 1995-97

Engine code: L1E, L1F, L1G, L1H, L1J, NGA, RDA, RDB, RKA, RKB, RQB, RQC, SEA

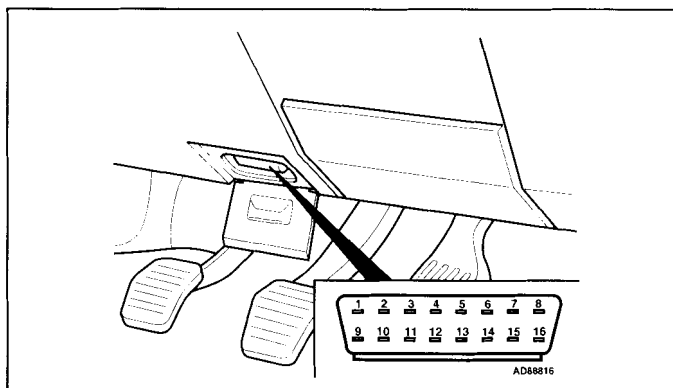
System: Ford EEC IV

Engine management/transmission

## Data link connector (DLC) locations



Fiesta/Escort



Mondeo

## Trouble codes

**NOTE:** Engine control module (ECM) incorporates transmission control function.

### General information

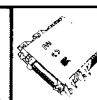
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The ECM fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

System code	Code meaning	Action
010	Separator/command code	Briefly depress accelerator pedal fully
020	Command code	Briefly depress brake pedal fully
030	Command code	Briefly depress brake pedal fully



Scanner type	Fault location	Probable cause
10	Cylinder 1, low	Cylinder compression, ignition components, injector
20	Cylinder 2, low	Cylinder compression, ignition components, injector
30	Cylinder 3, low	Cylinder compression, ignition components, injector
40	Cylinder 4, low	Cylinder compression, ignition components, injector
50	Cylinder 5, low	Cylinder compression, ignition components, injector
60	Cylinder 6, low	Cylinder compression, ignition components, injector
90	Cylinder balance test OK	—
111	Systems OK	—
112	Intake air temperature (IAT) sensor – voltage low	Wiring, IAT sensor, ECM
113	Intake air temperature (IAT) sensor – voltage high	Wiring, IAT sensor, ECM
114	Intake air temperature (IAT) sensor – range	IAT sensor
116	Engine coolant temperature (ECT) sensor – range	ECT sensor
117	Engine coolant temperature (ECT) sensor – voltage low	Wiring, ECT sensor, ECM
118	Engine coolant temperature (ECT) sensor – voltage high	Wiring, ECT sensor, ECM
121	Throttle position (TP) switch/sensor – range	TP switch/sensor
122	Throttle position (TP) switch/sensor – voltage low	Wiring, TP switch/sensor, ECM
123	Throttle position (TP) switch/sensor – voltage high	Wiring, TP switch/sensor, ECM
124	Throttle position (TP) switch/sensor – voltage high	Wiring, TP switch/sensor, ECM
125	Throttle position (TP) switch/sensor – voltage low	Wiring, TP switch/sensor, ECM
129	Mass air flow (MAF) sensor/manifold absolute pressure (MAP) sensor – no signal change during throttle 'blip'	Mass air flow (MAF) sensor/manifold absolute pressure (MAP) sensor
136	Heated oxygen sensor (HO2S) 2, bank 2 – weak mixture	Wiring, HO2S, ECM
137	Heated oxygen sensor (HO2S) 2, bank 2 – rich mixture	Wiring, HO2S, ECM
139	Heated oxygen sensor (HO2S) 2, bank 2 – weak/rich mixture	Wiring, HO2S, ECM
144	Heated oxygen sensor (HO2S) 1, bank 1 – weak/rich mixture	Wiring, HO2S, ECM
157	Mass air flow (MAF) sensor – voltage low	Wiring, MAF sensor, ECM
158	Mass air flow (MAF) sensor – voltage high	Wiring, MAF sensor, ECM
159	Mass air flow (MAF) sensor – range	Wiring, MAF sensor, ECM
167	Throttle position (TP) switch/sensor – no signal change during throttle 'blip'	TP switch/sensor
171	Heated oxygen sensor (HO2S) 1, bank 1 – adaptive limit reached	Fuel pressure, wiring, air leaks, injectors, ECM
172	Heated oxygen sensor (HO2S) 1, bank 1 – weak mixture	Wiring, HO2S, ECM
173	Heated oxygen sensor (HO2S) 1, bank 1 – rich mixture	Wiring, HO2S, ECM
174	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
175	Heated oxygen sensor (HO2S) 2, bank 2 – adaptive limit reached	Fuel pressure, wiring, air leaks, injectors, ECM
176	Heated oxygen sensor (HO2S) 2, bank 2 – weak mixture	Wiring, HO2S, ECM



**FORD**Model: Fiesta 1,6/1,8 16V • Escort 1,6/1,8 16V • Mondeo 1,6/1,8/2,0 16V  
Mondeo 2,5 V6**Engine management/transmission**

Scanner type	Fault location	Probable cause
177	Heated oxygen sensor (HO2S) 2, bank 2 – rich mixture	Wiring, HO2S, ECM
178	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
179	Fuel trim (part throttle) – weak mixture	Fuel pressure, air leaks, injectors, ignition system
181	Fuel trim (part throttle) – rich mixture	Fuel pressure, air leaks, injectors, ignition system
182	Fuel trim (idle) – weak mixture	Fuel pressure, air leaks, injectors, ignition system
183	Fuel trim (idle) – rich mixture	Fuel pressure, air leaks, injectors, ignition system
184	Mass air flow (MAF) sensor – air flow high	Wiring, MAF sensor, ECM
185	Mass air flow (MAF) sensor – air flow low	Wiring, MAF sensor, ECM
186	Injector pulse width – too long	Wiring, injectors, ECM
187	Injector pulse width – too short	Wiring, injectors, ECM
188	Heated oxygen sensor (HO2S), bank 2 – weak mixture	Wiring, fuel pressure, injectors, air leak, HO2S, ECM
189	Heated oxygen sensor (HO2S), bank 2 – rich mixture	Wiring, fuel pressure, injectors, air leak, HO2S, ECM
191	Heated oxygen sensor (HO2S), bank 2 – idle mixture weak	Wiring, fuel pressure, injectors, air leak, HO2S, ECM
192	Heated oxygen sensor (HO2S), bank 1 – idle mixture rich	Wiring, fuel pressure, injectors, air leak, HO2S, ECM
194	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
195	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
211	Profile ignition pick-up (PIP) signal	Wiring, CKP sensor, ignition control (EDIS) module, ECM
212	Tachometer circuit	Wiring, ignition control (EDIS) module, tachometer
213	Spark output (SPOUT) signal	Wiring, ignition control (EDIS) module, ECM
214	Camshaft position (CMP) sensor – circuit malfunction	Wiring, CMP sensor, ECM
215	Ignition coil 1, EDIS	Ignition coil
216	Ignition coil 2, EDIS	Ignition coil
217	Ignition coil 3, EDIS	Ignition coil
218	Tachometer circuit	Wiring, ignition control (EDIS) module, tachometer
222	Tachometer circuit	Wiring, ignition control (EDIS) module, tachometer
226	Ignition control (EDIS) module – pulse missing	Wiring, ignition control (EDIS) module, CKP/RPM sensor, ECM
227	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Wiring, CKP/RPM sensor
228	Ignition control (EDIS) module/ignition coil 1	Wiring, ignition control (EDIS) module, ignition coil
229	Ignition control (EDIS) module/ignition coil 2	Wiring, ignition control (EDIS) module, ignition coil



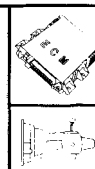
Scanner type	Fault location	Probable cause
231	Ignition control (EDIS) module/ignition coil 3	Wiring, ignition control (EDIS) module, ignition coil
232	Ignition coil primary circuit	Wiring, ignition coil
233	Ignition control (EDIS) module	Ignition control (EDIS) module
234	Ignition coil	Ignition coil
235	Ignition coil	Ignition coil
236	Ignition coil	Ignition coil
237	Ignition coil	Ignition coil
238	Ignition control (EDIS) module/ignition coil	Wiring, ignition control (EDIS) module, ignition coil
239	Profile ignition pick-up (PIP) signal – PIP signal occurs when engine cranking	Wiring, CKP/RPM sensor, ignition control (EDIS) module, ECM
241	Engine control module (ECM)/ignition control (EDIS) module – false data	Engine control module (ECM), ignition control (EDIS) module
243	Ignition coil	Ignition coil
311	Pulsed secondary air injection (PAIR) system	Wiring, PAIR solenoid, MAP/MAF/VAF sensor, ECM
312	Pulsed secondary air injection (PAIR) system	Wiring, PAIR solenoid, MAP/MAF/VAF sensor, ECM
313	Pulsed secondary air injection (PAIR) system	Wiring, PAIR solenoid, MAP/MAF/VAF sensor, ECM
314	Pulsed secondary air injection (PAIR) system	Wiring, PAIR solenoid, MAP/MAF/VAF sensor, ECM
315	Pulsed secondary air injection (PAIR) system	Wiring, PAIR solenoid, MAP/MAF/VAF sensor, ECM
316	Pulsed secondary air injection (PAIR) system	Wiring, PAIR solenoid, MAP/MAF/VAF sensor, ECM
326	Exhaust pressure (EP) sensor	Wiring, EP sensor, ECM
327	Exhaust pressure (EP) sensor/exhaust gas recirculation (EGR) solenoid	Wiring, EP sensor, EGR solenoid, ECM
328	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid, ECM
332	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid, ECM
334	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid, ECM
335	Exhaust pressure (EP) sensor	Wiring, EP sensor, ECM
336	Exhaust pressure (EP) – high	EP sensor
337	Exhaust pressure (EP) sensor/exhaust gas recirculation (EGR) solenoid	Wiring, EP sensor, EGR solenoid, ECM
338	Engine coolant temperature (ECT) sensor – temperature low	Wiring, ECT sensor, ECM
339	Engine coolant temperature (ECT) sensor – temperature high	Wiring, ECT sensor, ECM
341	Octane plug – connected to earth	Octane plug
411	Engine rpm too low during self-test	Wiring, compression, ignition, IAC valve, ECM
412	Engine rpm too high during self-test	Wiring, compression, ignition, IAC valve, ECM
413	Idle air control (IAC) valve	Wiring, IAC valve, ECM



**FORD**Model: Fiesta 1,6/1,8 16V • Escort 1,6/1,8 16V • Mondeo 1,6/1,8/2,0 16V  
Mondeo 2,5 V6**Engine management/transmission**

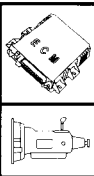
Scanner type	Fault location	Probable cause
414	Idle air control (IAC) valve	Wiring, IAC valve, ECM
415	Idle air control (IAC) valve	Wiring, IAC valve, ECM
416	Idle air control (IAC) valve	Wiring, IAC valve, ECM
452	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
511	Engine control module (ECM) – ROM error	ECM
512	Engine control module (ECM) – KAM error	ECM
513	Engine control module (ECM) – internal reference voltage	ECM
519	Power steering pressure (PSP) switch – not activated during self-test	Wiring, PSP switch
521	Power steering pressure (PSP) switch – not activated	Wiring, PSP switch
522	Park/neutral position (PNP) switch – circuit malfunction	Wiring, PNP switch, ECM
523	Park/neutral position (PNP) switch – circuit malfunction	Wiring, PNP switch, ECM
528	Clutch pedal position (CPP) switch – circuit malfunction	Wiring, CPP switch, ECM
536	Brake pedal position (BPP) switch – not activated during self-test	Wiring, BPP switch, ECM
538	Operator error during self-test	–
539	AC switched ON during self-test	Wiring, AC switch
542	Fuel pump – circuit malfunction	Wiring, fuel pump relay, IFS switch
543	Fuel pump – circuit malfunction	Wiring, fuel pump relay, IFS switch
551	Idle air control (IAC) valve – circuit malfunction	Wiring, IAC valve, ECM
552	Pulsed secondary air injection (PAIR) system – circuit malfunction	Wiring, PAIR solenoid
556	Fuel pump – circuit malfunction	Wiring, fuel pump relay
558	Exhaust gas recirculation (EGR) solenoid – circuit malfunction	Wiring, EGR solenoid, ECM
563	Engine coolant blower motor relay – circuit malfunction	Wiring, engine coolant blower motor relay
564	Engine coolant blower motor relay – circuit malfunction	Wiring, engine coolant blower motor relay
565	Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring, EVAP canister purge valve, ECM
566	3rd/4th gear shift solenoid	Wiring, 3rd/4th gear shift solenoid
573	Engine coolant blower motor relay – circuit malfunction	Wiring, engine coolant blower motor relay, ECM
574	Engine coolant blower motor relay – circuit malfunction	Wiring, engine coolant blower motor relay, ECM
575	Fuel pump/inertia fuel shut-off (IFS) switch – circuit	Wiring, fuel pump relay, IFS switch
576	Kick-down switch	Wiring, kick-down switch
577	Kick-down switch – not activated during self-test	Wiring, kick-down switch
612	Transmission range (TR) switch, 4th/3rd gear switch contacts – open circuit	Wiring, TR switch
613	Transmission range (TR) switch, 4th/3rd gear circuit – open circuit	Wiring, TR switch
614	Transmission range (TR) switch, 3rd/2nd gear circuit – short circuit	Wiring, TR switch
615	Transmission range (TR) switch, 3rd/2nd gear switch contacts – open circuit	Wiring, TR switch
621	Shift solenoid (SS) 1 – circuit malfunction	Wiring, shift solenoid, ECM
622	Shift solenoid (SS) 2 – circuit malfunction	Wiring, shift solenoid, ECM





Scanner type	Fault location	Probable cause
624	AT electronic pressure control solenoid	AT electronic pressure control solenoid
625	AT electronic pressure control solenoid – circuit malfunction	Wiring, AT electronic pressure control solenoid, ECM
628	Modulated torque converter clutch (TCC) solenoid	Wiring, TCC solenoid
629	Torque converter clutch (TCC) solenoid	Wiring, TCC solenoid
634	Park/neutral position (PNP) switch	Wiring, PNP switch
635	Transmission fluid temperature (TFT) switch – circuit malfunction	Wiring, TFT switch, ECM
636	Transmission fluid temperature (TFT) switch – circuit malfunction	Wiring, TFT switch, ECM
637	Transmission fluid temperature (TFT) switch – circuit malfunction	Wiring, TFT switch, ECM
638	Transmission fluid temperature (TFT) switch – circuit malfunction	Wiring, TFT switch, ECM
639	Turbine shaft speed (TSS) sensor – signal low	Wiring, TSS sensor
645	1st gear failure – incorrect ratio	Wiring, transmission fault
646	2nd gear failure – incorrect ratio	Wiring, transmission fault
647	3rd gear failure – incorrect ratio	Wiring, transmission fault
648	4th gear failure – incorrect ratio	Wiring, transmission fault
649	Electronic throttle valve – failure	Wiring, electronic throttle valve, ECM
651	Electronic throttle valve – intermittent failure	Wiring, electronic throttle valve, ECM
652	Modulated torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid, ECM
653	Transmission control switch – not activated during self-test	Wiring, transmission control switch, ECM
658	Performance/economy switch – not activated during self-test	Wiring, performance/economy switch, ECM
998	ECT sensor/IAT sensor/MAF sensor/TP sensor – circuit malfunction	Wiring, ECT sensor/IAT sensor/MAF sensor/TP sensor, ECM



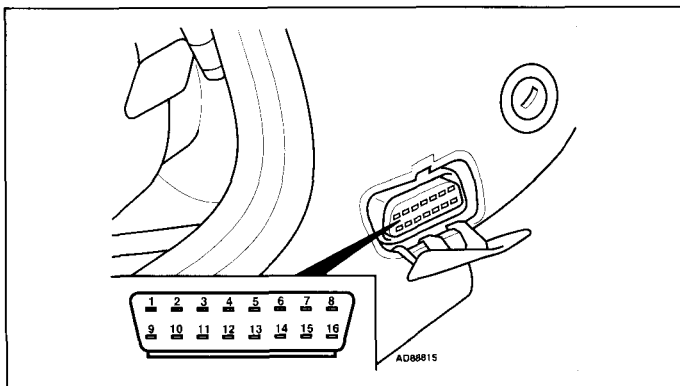


**FORD**

Model: Escort RS 2000 • Escort Cosworth  
 Year: 1995-96  
 Engine code: N7A, N5E  
 System: Ford EEC IV

Engine management/transmission

## Data link connector (DLC) locations



1995 →

## Trouble codes

**NOTE:** Engine control module (ECM) incorporates transmission control function.

### General information

- ❑ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ❑ Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- ❑ The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).

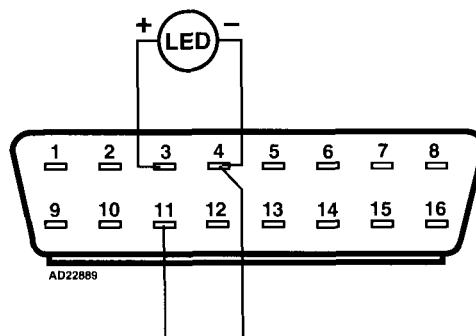
### Accessing

- Engine at normal operating temperature.
- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 4 and 11 **1**.
- Connect LED test lamp negative connection to DLC terminal 4 **1**.
- Connect LED test lamp positive connection to DLC terminal 3 **1**.
- Switch ignition ON.
- Check that LED illuminates.
- Trouble codes are displayed after 10-25 seconds **2** [A].
- Note trouble codes. Compare with trouble code table.
- Trouble codes are displayed by illuminated LED switching OFF for approximately 1 second **2** [B].
- Each trouble code consists of two groups. LED illuminates for approximately 2 seconds between each group **2** [C].

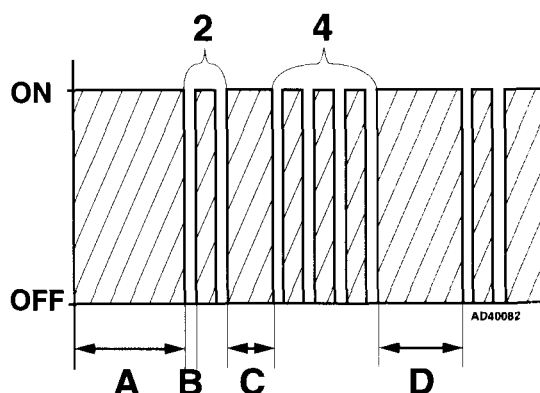
**NOTE:** Trouble codes ending in '0' are displayed with only 1 group.

- LED illuminates for approximately 5 seconds between each trouble code **2** [D].
- Trouble code(s) are displayed twice.

**1**



**2**



### Erasing

- Ensure ignition switched OFF.
- Disconnect engine control module (ECM) harness multi-plug.

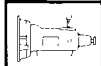
**Trouble code identification**

Flash type	Fault location	Probable cause
10	Command code	–
11	System pass	–
12	Volume air flow (VAF) sensor 1	Wiring, VAF sensor, air leak, air restriction, ECM
13	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
14	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
15	Throttle position (TP) sensor	Wiring, TP sensor, ECM
16	Volume air flow (VAF) sensor 2	Wiring, VAF sensor, ECM
17	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
18	Battery voltage – low	Wiring, battery
19	Keep Alive Memory (KAM) failure	ECM
20	Separation code	–
21	Ignition signal – erratic	Wiring, CKP sensor, alternator
22	Volume air flow (VAF) sensor 1 – voltage high	Wiring, VAF sensor, ECM
23	Engine coolant temperature (ECT) sensor – voltage high	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
25	Throttle position (TP) sensor – voltage high	Wiring, TP sensor, ECM
26	Volume air flow (VAF) sensor 2 – voltage high	Wiring, VAF sensor, ECM
27	Manifold absolute pressure (MAP) sensor – voltage high	Wiring, MAP sensor, ECM
28	Heated oxygen sensor (HO2S) – mixture rich	Wiring, fuel supply, injector control, HO2S, ECM
28	Heated oxygen sensor (HO2S) 1 – mixture rich	Wiring, fuel supply, injector control, HO2S, ECM
29	Heated oxygen sensor (HO2S) 2 – mixture rich	Fuel supply, injector control, wiring, HO2S, ECM
31	Memory failure	ECM
32	Volume air flow (VAF) sensor 1 – voltage low	Wiring, VAF sensor, ECM
33	Engine coolant temperature (ECT) sensor – voltage low	Wiring, ECT sensor, ECM
34	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
35	Throttle position (TP) sensor – voltage low	Wiring, TP sensor, ECM
36	Volume air flow (VAF) sensor 2 – voltage low	Wiring, VAF sensor, ECM
37	Manifold absolute pressure (MAP) sensor – voltage low	Wiring, MAP sensor, ECM
38	Heated oxygen sensor (HO2S) – mixture weak	Wiring, fuel supply, injector control, HO2S, ECM
38	Heated oxygen sensor (HO2S) 1 – mixture weak	Wiring, fuel supply, injector control, HO2S, ECM
39	Heated oxygen sensor (HO2S) 2 – mixture weak	Wiring, fuel supply, injector control, HO2S, ECM
41	Volume air flow (VAF) sensor 1 – signal	Wiring, VAF sensor, ECM
42	Volume air flow (VAF) sensor 2 – signal	Wiring, VAF sensor, ECM
42	Manifold absolute pressure (MAP) sensor – signal	Wiring, MAP sensor, ECM
43	Throttle position (TP) sensor – signal	Wiring, TP sensor, ECM
44	Blip test (throttle open) not performed	–



**FORD**

Model: Escort RS 2000 • Escort Cosworth

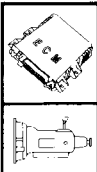
**Engine management/transmission**

Flash type	Fault location	Probable cause
45	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
46	Idle air control (IAC) valve – maximum engine speed	Wiring, IAC valve, ECM
47	Idle air control (IAC) valve – minimum engine speed	Wiring, IAC valve, ECM
48	Idle air control (IAC) valve	Wiring, IAC valve, ECM
49	Exhaust gas recirculation (EGR) valve	Wiring, restricted/leaking EGR pipes, EGR valve, ECM
50	Identification code for engine control module (ECM)	–
51	AC 'ON' during test	–
52	AT in 'D' during test	–
53	Octane plug 1 – short circuit	–
54	Octane plug 2 – short circuit	–
55	Idle speed adjust – short circuit	–
56	Knock sensor (KS)	Wiring, fuel quality, ignition timing, KS, ECM
57	Throttle opened too early during test	–
58	Phasing of ignition pick-up/spark output signals	Wiring, CKP sensor, ignition control module (ICM), ECM
59	Mixture adjustment resistor	Wiring, air leaks, vacuum leaks, MAP sensor, mixture adjustment resistor, injectors, spark plugs
60	Start of service set mode	–
61	Power loss – cylinder 1	Compression, spark plugs
62	Power loss – cylinder 2	Compression, spark plugs
63	Power loss – cylinder 3	Compression, spark plugs
64	Power loss – cylinder 4	Compression, spark plugs
65	Brake pedal position (BPP) switch – ON/OFF	Wiring, BPP switch, ECM
66	Kick-down switch (DOHC)	Wiring, kick-down switch, ECM
67	Fuel temperature switch	Wiring, fuel temperature switch
68	Turbocharger (TC) wastegate regulating valve	Wiring, valve, turbocharger, ECM
69	Turbocharger (TC) wastegate regulating valve	Wiring, valve, turbocharger, ECM
70	End of service set mode	–
71	Secondary air injection (AIR) solenoid	Wiring, AIR solenoid, blocked/leaking pipes, ECM
72	Exhaust gas recirculation (EGR) solenoid	Wiring, blocked/leaking pipes, EGR solenoid, ECM
72	Turbocharger (TC) wastegate regulating valve	Wiring, wastegate regulating valve, blocked/leaking pipes, ECM
73	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
74	Fuel pump	Wiring, fuel pump relay, fuel pump, ECM
74	3rd/4th gear shift solenoid	Wiring, shift solenoid, transmission fault, ECM
75	Torque converter clutch (TCC) lock-up solenoid	Wiring, lock-up solenoid, transmission fault, ECM
76	Brake pedal position (BPP) switch – AT	Wiring, BPP switch, brake pedal, ECM
77	Kickdown actuated	–
78	Power steering pressure (PSP) switch – not activated	Wiring, PSP switch, power steering pump, power steering system pressure, ECM



Flash type	Fault location	Probable cause
81	Exhaust gas recirculation (EGR) solenoid	Wiring, blocked/leaking pipes, EGR solenoid, ECM
82	Exhaust gas recirculation (EGR) backpressure transducer – voltage below minimum	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
83	Exhaust gas recirculation (EGR) backpressure transducer – voltage high	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
84	Exhaust gas recirculation (EGR) backpressure transducer – voltage low	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
91	Heated oxygen sensors (HO2S) – multi-plugs interchanged	Wiring, multi-plugs





# FORD

Model: Sierra 1,6/2,0/2,8 • Granada/Scorpio 2,0/2,9 V6  
Transit 2,0/2,9 V6

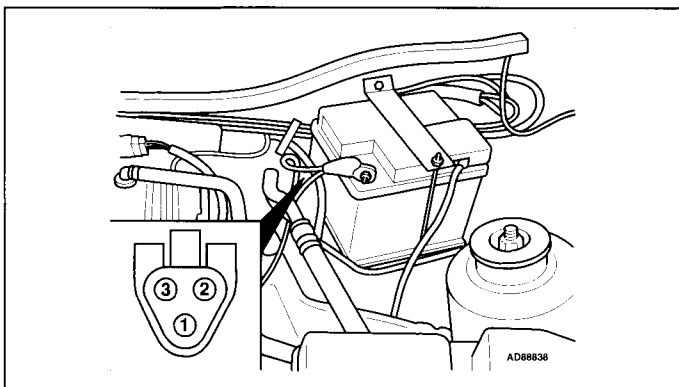
Year: 1986-95

Engine code: BRC, BRT, B4T, L6B, NCA, N4A, N4B, N6T, N6S, N9A, N9B, N9C, N9D, N9E, N9F, PR7, PR8

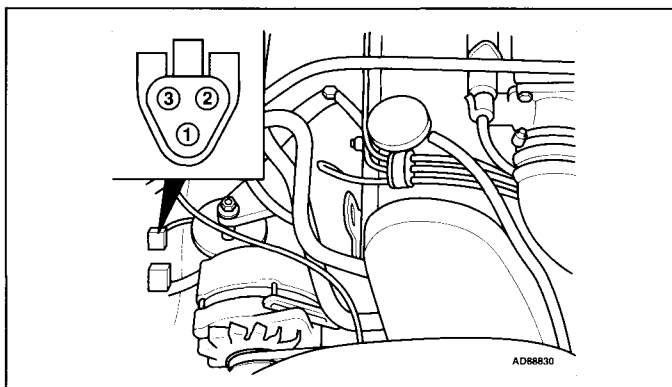
System: Ford CFI/EEC IV

## Engine management/transmission

### Data link connector (DLC) locations



Sierra/Granada/Scorpio



Transit

### Trouble codes

**NOTE:** Engine control module (ECM) incorporates transmission control function.

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).

#### Accessing

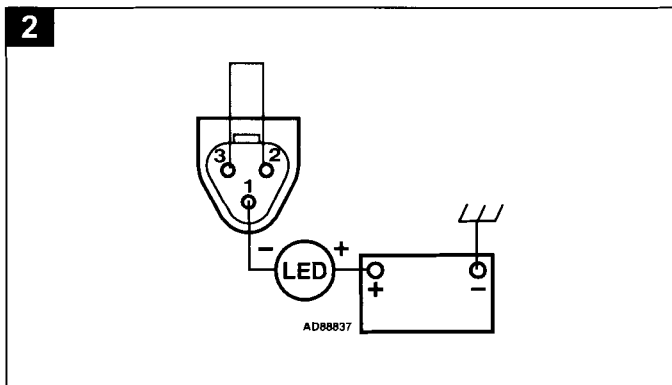
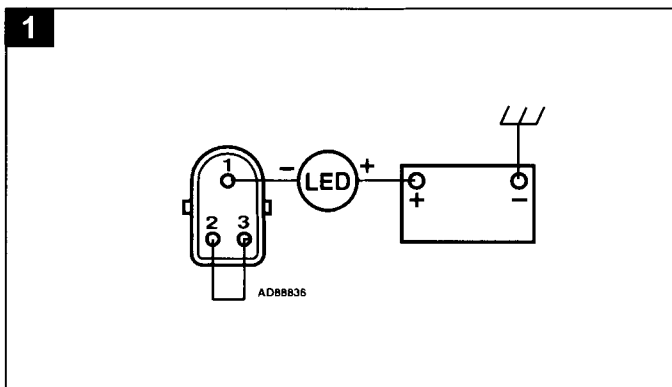
- Ensure ignition switched OFF.
- Engine at normal operating temperature.
- Connect LED test lamp positive connection to battery positive **1** →1989 or **2** 1990→.
- Connect LED test lamp negative connection to DLC terminal 1 **1** →1989 or **2** 1990→.
- Switch ignition ON.

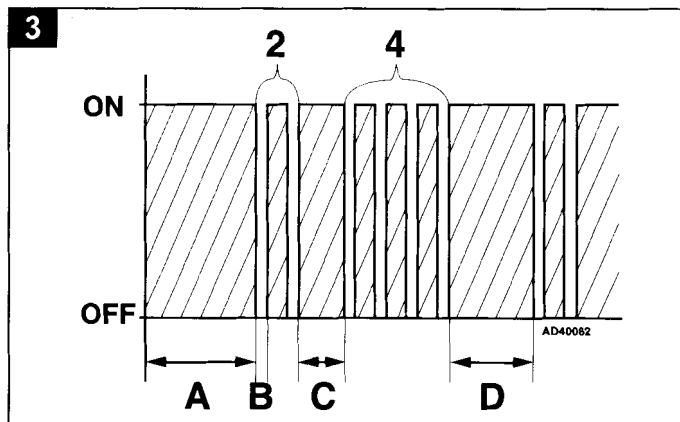
**NOTE:** LED will illuminate a few seconds after ignition is switched ON.

- Before LED illuminates: Bridge data link connector (DLC) terminals 2 and 3 **1** →1989 or **2** 1990→.
- Check that LED illuminates.
- Trouble codes are displayed after 10-30 seconds **3** [A].
- Note trouble codes. Compare with trouble code table.
- Trouble codes are displayed by illuminated LED switching OFF for approximately 1 second **3** [B].
- Each trouble code consists of two groups. LED illuminates for approximately 2 seconds between each group **3** [C].

**NOTE:** Trouble codes ending in '0' are displayed with only 1 group.

- LED illuminates for approximately 5 seconds between each trouble code **3** [D].
- For example: Trouble code 24 displayed.
- Trouble code(s) are displayed twice.



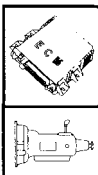


### Erasing

- Ensure ignition switched OFF.
- Disconnect engine control module (ECM) harness multi-plug.

### Trouble code identification

Flash type	Fault location	Probable cause
10	Command code	–
11	System pass	–
12	Volume air flow (VAF) sensor 1	Wiring, VAF sensor, air leak, air restriction, ECM
13	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
14	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
15	Throttle position (TP) sensor	Wiring, TP sensor, ECM
16	Volume air flow (VAF) sensor 2	Wiring, VAF sensor, ECM
17	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
18	Battery voltage – low	Wiring, battery
19	Keep Alive Memory (KAM) failure	ECM
20	Separation code	–
21	Ignition signal – erratic	Wiring, CKP sensor, alternator
22	Volume air flow (VAF) sensor 1 – voltage high	Wiring, VAF sensor, ECM
23	Engine coolant temperature (ECT) sensor – voltage high	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
25	Throttle position (TP) sensor – voltage high	Wiring, TP sensor, ECM
26	Volume air flow (VAF) sensor 2 – voltage high	Wiring, VAF sensor, ECM
27	Manifold absolute pressure (MAP) sensor – voltage high	Wiring, MAP sensor, ECM
28	Heated oxygen sensor (HO2S) – mixture rich	Wiring, fuel supply, injector control, HO2S, ECM
28	Heated oxygen sensor (HO2S) 1 (2,0 DOHC 16V) – mixture rich	Wiring, fuel supply, injector control, HO2S, ECM
29	Heated oxygen sensor (HO2S) 2 (2,0 DOHC 16V) – mixture rich	Fuel supply, injector control, wiring, HO2S, ECM
30	Identification code for 6 cylinder engines	–
31	Memory failure	ECM
32	Volume air flow (VAF) sensor 1 – voltage low	Wiring, VAF sensor, ECM

**FORD**Model: Sierra 1,6/2,0/2,8 • Granada/Scorpio 2,0/2,9 V6  
Transit 2,0/2,9 V6**Engine management/transmission**

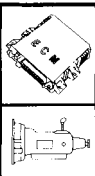
Flash type	Fault location	Probable cause
33	Engine coolant temperature (ECT) sensor – voltage low	Wiring, ECT sensor, ECM
34	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
35	Throttle position (TP) sensor – voltage low	Wiring, TP sensor, ECM
36	Volume air flow (VAF) sensor 2 – voltage low	Wiring, VAF sensor, ECM
37	Manifold absolute pressure (MAP) sensor – voltage low	Wiring, MAP sensor, ECM
38	Heated oxygen sensor (HO2S) – mixture weak	Wiring, fuel supply, injector control, HO2S, ECM
38	Heated oxygen sensor (HO2S) 1 (2,0 DOHC 16V) – mixture weak	Wiring, fuel supply, injector control, HO2S, ECM
39	Heated oxygen sensor (HO2S) 2 (2,0 DOHC 16V) – mixture weak	Wiring, fuel supply, injector control, HO2S, ECM
41	Volume air flow (VAF) sensor 1 – signal	Wiring, VAF sensor, ECM
42	Volume air flow (VAF) sensor 2 – signal	Wiring, VAF sensor, ECM
42	Manifold absolute pressure (MAP) sensor – signal	Wiring, MAP sensor, ECM
43	Throttle position (TP) sensor – signal	Wiring, TP sensor, ECM
44	Blip test (throttle open) not performed	–
45	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
46	Idle air control (IAC) valve – maximum engine speed	Wiring, IAC valve, ECM
47	Idle air control (IAC) valve – minimum engine speed	Wiring, IAC valve, ECM
48	Closed throttle position (CTP) switch (CFi)	Wiring, CTP switch, ECM
48	Idle air control (IAC) valve (except CFi)	Wiring, IAC valve, ECM
49	Exhaust gas recirculation (EGR) valve	Wiring, restricted/leaking EGR pipes, EGR valve, ECM
50	Identification code for engine control module (ECM)	–
51	AC 'ON' during test	–
52	AT in 'D' during test	–
53	Octane plug 1 – short circuit	–
54	Octane plug 2 – short circuit	–
55	Idle speed adjust – short circuit	–
56	Knock sensor (KS)	Wiring, fuel quality, ignition timing, KS, ECM
57	Throttle opened too early during test	–
58	Phasing of ignition pick-up/spark output signals	Wiring, CKP sensor, ignition control module (ICM), ECM
59	Mixture adjustment resistor	Wiring, air leaks, vacuum leaks, MAP sensor, mixture adjustment resistor, injectors, spark plugs
60	Start of service set mode	–
61	Power loss – cylinder 1	Compression, spark plugs
62	Power loss – cylinder 2	Compression, spark plugs
63	Power loss – cylinder 3	Compression, spark plugs
64	Power loss – cylinder 4	Compression, spark plugs





Flash type	Fault location	Probable cause
65	Power loss – cylinder 5	Compression, spark plugs
65	Brake pedal position (BPP) switch – ON/OFF (DOHC)	Wiring, BPP switch, ECM
66	Power loss – cylinder 6	Compression, spark plugs
66	Kick-down switch (DOHC)	Wiring, kick-down switch, ECM
67	Fuel temperature switch	Wiring, fuel temperature switch
68	Turbocharger (TC) wastegate regulating valve	Wiring, valve, turbocharger, ECM
69	Turbocharger (TC) wastegate regulating valve	Wiring, valve, turbocharger, ECM
70	End of service set mode	–
71	Secondary air injection (AIR) solenoid	Wiring, AIR solenoid, blocked/leaking pipes, ECM
72	Exhaust gas recirculation (EGR) solenoid	Wiring, blocked/leaking pipes, EGR solenoid, ECM
73	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
74	Fuel pump	Wiring, fuel pump relay, fuel pump, ECM
74	3rd/4th gear shift solenoid (DOHC)	Wiring, shift solenoid, transmission fault, ECM
75	Torque converter clutch (TCC) lock-up solenoid	Wiring, lock-up solenoid, transmission fault, ECM
76	Brake pedal position (BPP) switch – AT	Wiring, BPP switch, brake pedal, ECM
77	Kickdown actuated	–
78	Power steering pressure (PSP) switch – not activated	Wiring, PSP switch, power steering pump, power steering system pressure, ECM
81	Exhaust gas recirculation (EGR) solenoid	Wiring, blocked/leaking pipes, EGR solenoid, ECM
82	Exhaust gas recirculation (EGR) backpressure transducer – voltage below minimum	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
83	Exhaust gas recirculation (EGR) backpressure transducer – voltage high	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
84	Exhaust gas recirculation (EGR) backpressure transducer – voltage low	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
91	Heated oxygen sensors (HO2S) – multi-plugs interchanged	Wiring, multi-plugs





# FORD

Model: Sierra 1,8 • Sierra 2,9 V6  
Granada/Scorpio 2,4/2,9 V6 • Transit 2,9 V6

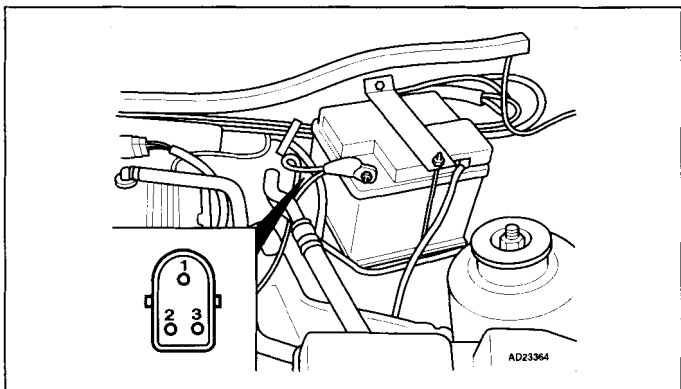
Year: 1986-95

Engine code: ARD, BRD, BRE, BRF, BRT, BRV, B4B, B4C, R6A

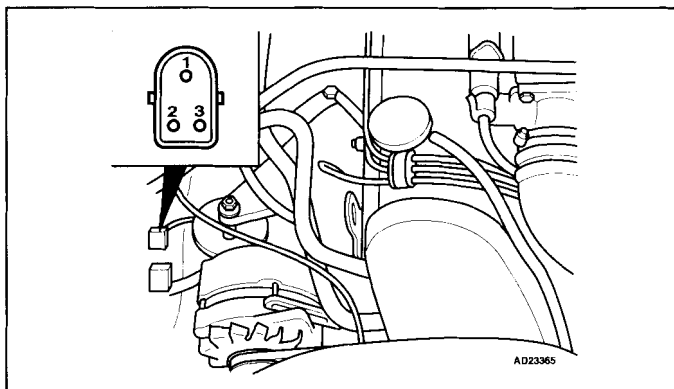
System: Ford CFi/EEC IV

Engine management/transmission

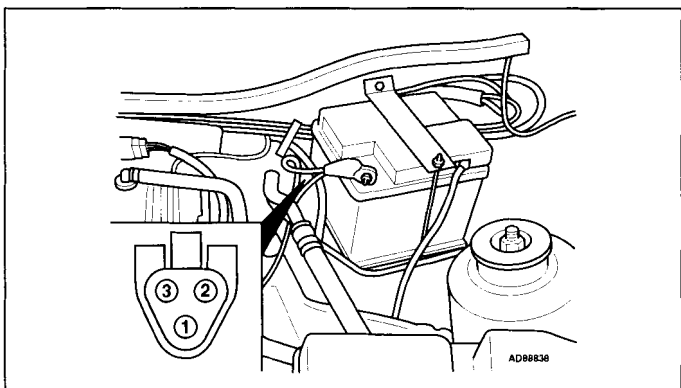
## Data link connector (DLC) locations



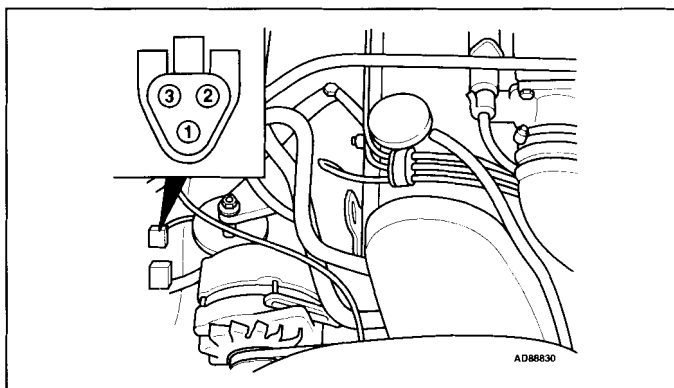
Sierra/Granada/Scorpio - →1989



Transit - →1989



Sierra/Granada/Scorpio - 1990→



Transit - 1990→

## Trouble codes

**NOTE:** Engine control module (ECM) incorporates transmission control function.

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).

### Accessing

- Ensure ignition switched OFF.
- Engine at normal operating temperature.
- Connect LED test lamp positive connection to battery positive **1** →1989 or **2** 1990→.

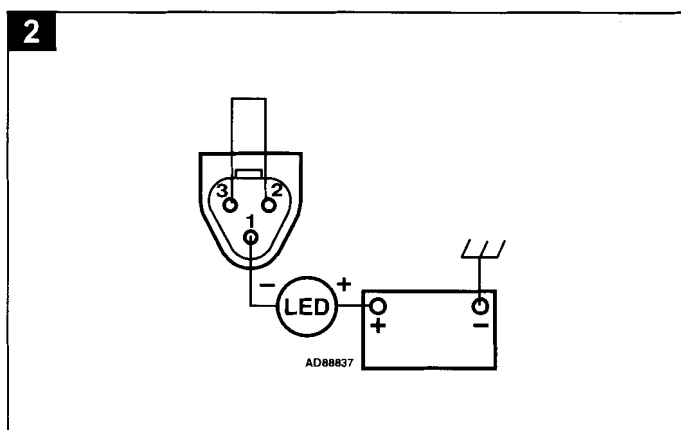
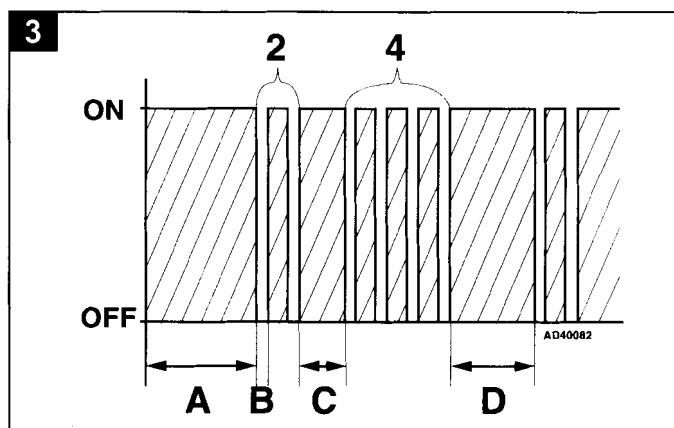
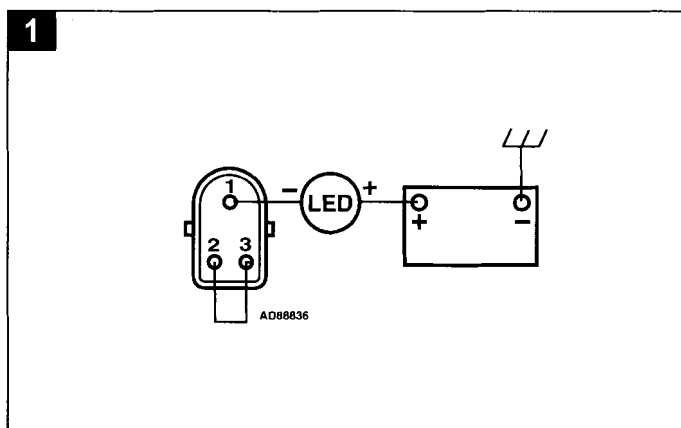
- Connect LED test lamp negative connection to DLC terminal 1 **1** →1989 or **2** 1990→.
- Switch ignition ON.

**NOTE:** LED will illuminate a few seconds after ignition is switched ON.

- Before LED illuminates: Bridge data link connector (DLC) terminals 2 and 3 **1** →1989 or **2** 1990→.
- Check that LED illuminates.
- Trouble codes are displayed after 10-30 seconds **3** [A].
- Note trouble codes. Compare with trouble code table.
- Trouble codes are displayed by illuminated LED switching OFF for approximately 1 second **3** [B].
- Each trouble code consists of two groups. LED illuminates for approximately 2 seconds between each group **3** [C].

**NOTE:** Trouble codes ending in '0' are displayed with only 1 group.

- LED illuminates for approximately 5 seconds between each trouble code **3** [D].
- Trouble code(s) are displayed twice.



### Erasing

- Ensure ignition switched OFF.
- Disconnect engine control module (ECM) harness multi-plug.

### Trouble code identification

Flash type	Fault location	Probable cause
10	Command code	–
11	System pass	–
12	Idle air control (IAC) valve	Wiring, IAC valve, ECM
12	Idle speed control (ISC) actuator – CFI	Wiring, ISC actuator, ECM
13	Idle air control (IAC) valve	Wiring, IAC valve, ECM
13	Idle speed control (ISC) actuator – CFI	Wiring, ISC actuator, ECM
14	Ignition signal	Wiring, CKP sensor, alternator
15	Engine control module (ECM) – KAM/ROM error	ECM
16	Low idle speed during test	–
17	Idle speed control (ISC) actuator – CFI	Wiring, ISC actuator, ECM
18	Ignition amplifier	Wiring, ignition amplifier, CKP/RPM sensor, ECM
19	Ignition amplifier – supply	Wiring
20	4 cylinder identification code	–
21	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
22	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM



**FORD**Model: Sierra 1,8 • Sierra 2,9 V6 • Granada/Scorpio 2,4/2,9 V6  
Transit 2,9 V6

Engine management/transmission

Flash type	Fault location	Probable cause
23	Throttle position (TP) sensor	Wiring, TP sensor, ECM
24	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
25	Knock sensor (KS)	Wiring, fuel quality, ignition timing, KS, ECM
26	Idle speed control (ISC) actuator – CFI	Wiring, ISC actuator, ECM
27	Cruise control – too slow	Vacuum pipes blocked/leaking, throttle valve sticking
28	Cruise control – too fast	Vacuum pipes blocked/leaking, throttle valve sticking
29	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
30	6 cylinder identification code	–
31	Exhaust gas recirculation (EGR) backpressure transducer – voltage low	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
32	Exhaust gas recirculation (EGR) backpressure transducer – outside specification	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
33	Exhaust gas recirculation (EGR) solenoid – no gas recirculation	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
34	Exhaust gas recirculation (EGR) backpressure transducer – outside specification	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
35	Exhaust gas recirculation (EGR) backpressure transducer – voltage high	Wiring, blocked/leaking pipes, EGR backpressure transducer, ECM
36	No RPM increase during test	–
37	No RPM decrease during test	–
37	Closed throttle position (CTP) switch – CFI	Wiring, CTP switch, ECM
38	Closed throttle position (CTP) switch – CFI	Wiring, CTP switch, ECM
39	AT lock-up solenoid fault	Wiring, AT lock-up solenoid
41	Heated oxygen sensor (HO2S) 1, cylinders 1-3 – mixture weak	Wiring, air leak, exhaust leak, HO2S, ECM
42	Heated oxygen sensor (HO2S) 1, cylinders 1-3 – mixture rich	Wiring, air leak, exhaust leak, HO2S, ECM
43	Idle speed control (ISC) actuator – CFI	Wiring, ISC actuator, ECM
44	Throttle position (TP) sensor	Wiring, TP sensor, ECM
45	Closed throttle position (CTP) switch – CFI	Wiring, CTP switch, ECM
47	Cruise control switch	Wiring, cruise control switch
48	Cruise control switch	Wiring, cruise control switch
49	Cruise control signal	Wiring, cruise control switch, cruise control actuator, ECM
51	Engine coolant temperature (ECT) sensor – voltage high	Wiring, ECT sensor, ECM
52	Power steering pressure (PSP) switch – not activated during test	Wiring, PSP switch, ECM
53	Throttle position (TP) sensor – voltage high	Wiring, TP sensor, ECM
54	Intake air temperature (IAT) sensor – voltage high	Wiring, IAT sensor, ECM
57	Octane adjuster – short circuit	Octane adjuster wiring
58	Ignition timing delayed	Octane adjuster wiring
59	Idle adjuster – short circuit	Octane adjuster wiring

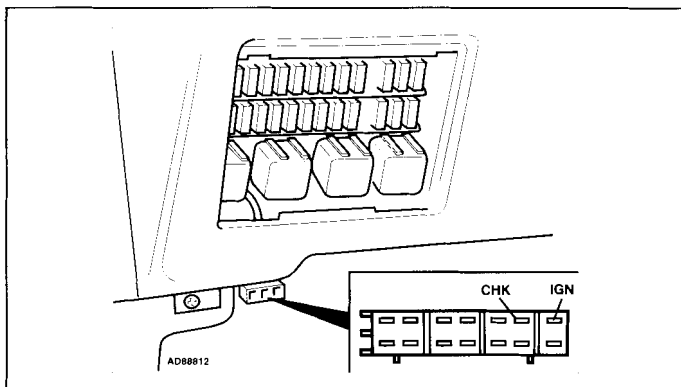


Flash type	Fault location	Probable cause
61	Engine coolant temperature (ECT) sensor – voltage low	Wiring, ECT sensor, ECM
62	AT shift valve closed	Transmission mechanical fault
63	Throttle position (TP) sensor – voltage low	Wiring, TP sensor, ECM
64	Intake air temperature (IAT) sensor – voltage low	Wiring, IAT sensor, ECM
67	AC ON or AT in D	Wiring, AC switch, transmission range (TR) switch
68	Closed throttle position (CTP) switch – CFI	Wiring, CTP switch, ECM
71	Closed throttle position (CTP) switch – CFI	Wiring, CTP switch, ECM
72	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
73	Throttle position (TP) sensor – no change during test	Wiring, TP sensor
74	Brake pedal position (BPP) switch – circuit malfunction	Wiring, BPP switch
75	Brake pedal position (BPP) switch – short circuit	Wiring, BPP switch
77	Throttle not operated or operated too late	Wiring, TP switch/sensor
81	Manifold absolute pressure (MAP) sensor – Transit	Wiring, vacuum pipe, manifold vacuum, MAP sensor
82	Secondary air injection (AIR) solenoid	Wiring, AIR solenoid
83	Heavy duty fan switch	Wiring, heavy duty fan switch
84	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid
85	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP solenoid
87	Fuel pump	Wiring, fuel pump relay, fuel pump, ECM
88	Electric cooling fan	Wiring, cooling fan motor
89	AT lock-up solenoid	Wiring, lock-up solenoid
91	Heated oxygen sensor (HO2S) 2, cylinders 4-6 – mixture weak	Wiring, air leak, exhaust leak, HO2S, ECM
92	Heated oxygen sensor (HO2S) 2, cylinders 4-6 – mixture rich	Wiring, air leak, exhaust leak, HO2S, ECM
93	Idle speed control (ISC) actuator – CFI	Wiring, ISC actuator, ECM
95	MAP sensor/ECT sensor/IAT sensor/TP sensor	Wiring, MAP sensor/ECT sensor/IAT sensor/TP sensor, ECM
96	MAP sensor/ECT sensor/IAT sensor/TP sensor	Wiring, MAP sensor/ECT sensor/IAT sensor/TP sensor, ECM
98	MAP sensor/ECT sensor/IAT sensor/TP sensor	Wiring, MAP sensor/ECT sensor/IAT sensor/TP sensor, ECM
99	Throttle position (TP) sensor	Wiring, TP sensor



**FORD**

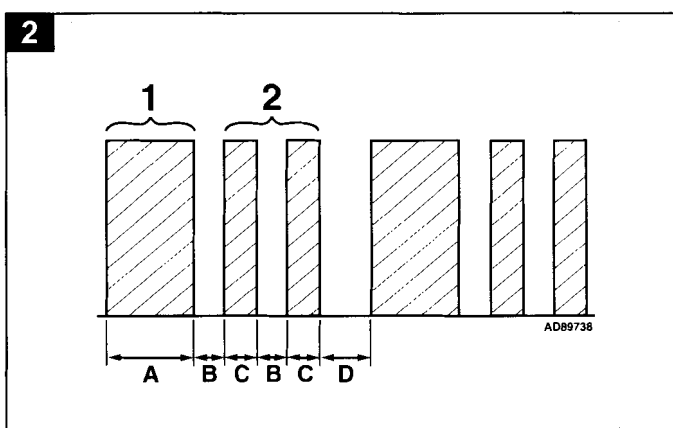
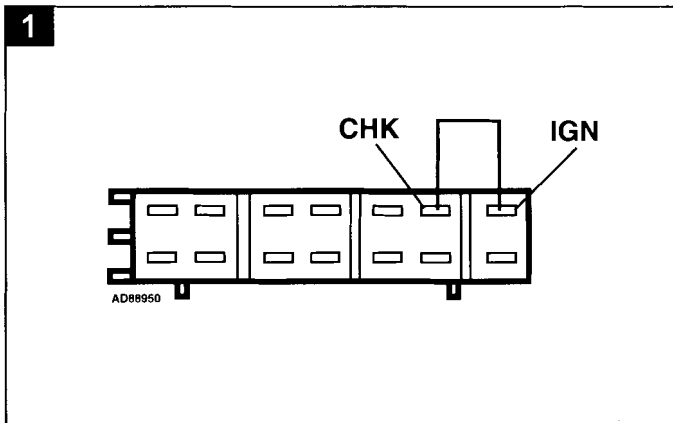
Model: **Maverick 2,4**  
 Year: **1993-98**  
 Engine code: **KA24, KA24E**  
 System: **Nissan ECCS**

**Engine management****Data link connector (DLC) locations****Trouble codes****General information**

- ❑ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ❑ Trouble codes are displayed by the malfunction indicator lamp (MIL).
- ❑ The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).

**Accessing**

- Ensure ignition switched OFF.
- Switch ignition ON.
- Bridge data link connector (DLC) terminals IGN and CHK **1**.
- Wait 2 seconds minimum.
- Disconnect bridge wire from data link connector (DLC).
- Count MIL flashes. Compare with trouble code table.
- Each trouble code consists of two groups of flashes **2**.
- Long flashes indicate the 'tens' **2** [A].
- Short flashes indicate the 'units' **2** [C].
- A short pause separates each flash **2** [B].
- A long pause separates each trouble code **2** [D].
- For example: 1 long flash followed by 2 short flashes indicates trouble code 12 – mass air flow (MAF) sensor.
- Switch ignition OFF.



**Erasing**

- Ensure ignition switched OFF.
- Switch ignition ON.
- Bridge data link connector (DLC) terminals IGN and CHK **1**.
- Wait 2 seconds minimum.
- Disconnect bridge wire from data link connector (DLC).
- Bridge data link connector (DLC) terminals IGN and CHK **1**.
- Wait 2 seconds minimum.
- Disconnect bridge wire from data link connector (DLC).
- Switch ignition OFF.

**NOTE:** *Trouble codes can also be erased by disconnecting battery earth lead for 24 hours.*

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

**Trouble code identification**

Flash type	Fault location	Probable cause
11	Crankshaft position (CKP) sensor/engine speed (RPM) sensor/camshaft position (CMP) sensor – incorrect signal	Wiring, CKP/RPM/CMP sensor, ECM
12	Mass air flow (MAF) sensor – voltage low/high	Wiring, MAF sensor, ECM
13	Engine coolant temperature (ECT) sensor – voltage low/high	Wiring, ECT sensor, ECM
21	Ignition signal	Wiring, ignition amplifier, ECM
41	Intake air temperature (IAT) sensor – voltage low/high	Wiring, IAT sensor, ECM
43	Throttle position (TP) sensor – voltage low/high – circuit	Wiring, TP sensor, ECM
55	No fault found	–

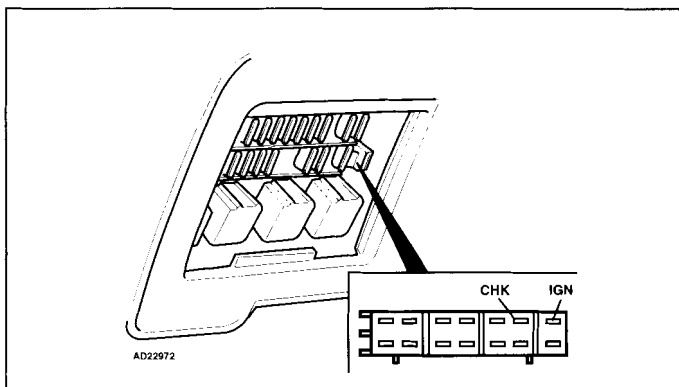


**FORD**

Model: **Maverick 2,7 D Turbo**  
Year: **1996-98**  
Engine code: **TD27E**  
System: **EDC**

## Engine management

### Data link connector (DLC) locations



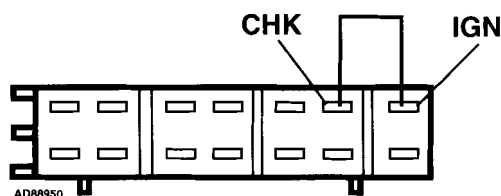
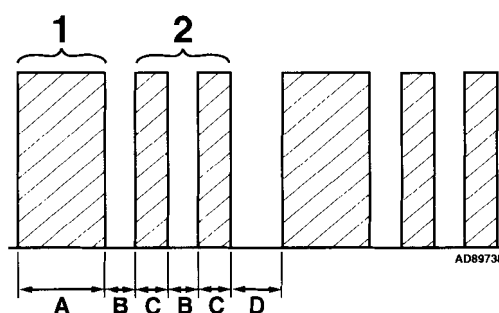
### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).

#### Accessing

- Ensure ignition switched OFF.
- Switch ignition ON.
- Bridge data link connector (DLC) terminals IGN and CHK **1**.
- Wait 2 seconds minimum.
- Disconnect bridge wire from data link connector (DLC).
- Count MIL flashes. Compare with trouble code table.
- Each trouble code consists of two groups of flashes **2**.
- Long flashes indicate the 'tens' **2** [A].
- Short flashes indicate the 'units' **2** [C].
- A short pause separates each flash **2** [B].
- A long pause separates each trouble code **2** [D].
- For example: 1 long flash followed by 2 short flashes indicates trouble code 12 – mass air flow (MAF) sensor.
- Switch ignition OFF.

**1****2**



**Erasing**

- Ensure ignition switched OFF.
- Switch ignition ON.
- Bridge data link connector (DLC) terminals IGN and CHK **1**.
- Wait 2 seconds minimum.
- Disconnect bridge wire from data link connector (DLC).
- Bridge data link connector (DLC) terminals IGN and CHK **1**.

- Wait 2 seconds minimum.
- Disconnect bridge wire from data link connector (DLC).
- Switch ignition OFF.

**NOTE:** *Trouble codes can also be erased by disconnecting battery earth lead for 24 hours.*

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

**Trouble code identification**

Flash type	Fault location	Probable cause
11	Camshaft position (CMP) sensor – incorrect signal	Wiring, CMP sensor, ECM
12	Mass air flow (MAF) sensor – voltage low/high	Wiring, MAF sensor, ECM
13	Engine coolant temperature (ECT) sensor – voltage low/high	Wiring, ECT sensor, ECM
14	Vehicle speed sensor (VSS) – incorrect signal	Wiring, VSS, ECM
15	Fuel quantity position sensor – voltage low/high	Wiring, fuel quantity position sensor, ECM
17	Module coding plug – voltage low/high	Wiring, module coding plug, ECM
18	Fuel quantity adjuster position sensor – circuit malfunction	Wiring, fuel quantity adjuster position sensor, fuel quantity adjuster, ECM
21	Fuel quantity adjuster position sensor – circuit malfunction	Wiring, fuel quantity adjuster position sensor, fuel quantity adjuster, injector needle lift sensor, fuel injection timing solenoid, ECM
22	Fuel quantity adjuster position sensor – circuit malfunction	Wiring, fuel quantity adjuster position sensor, fuel quantity adjuster, ECM
23	Accelerator pedal position (APP) switch – circuit malfunction	Wiring, APP switch, ECM
25	Fuel quantity adjuster – circuit malfunction	Wiring, fuel quantity adjuster, ECM
27	Engine control module (ECM) – internal malfunction	ECM
31	Engine control module (ECM) – internal malfunction	ECM
34	Injector needle lift sensor – incorrect signal	Wiring, air in fuel line, injector 1 blocked, injector needle lift sensor, ECM
36	Fuel shut-off solenoid – short circuit	Wiring, fuel shut-off solenoid, ECM
37	Fuel shut-off solenoid – open circuit/malfunction	Wiring, fuel shut-off solenoid, ECM
38	Fuel shut-off solenoid – open circuit/malfunction	Wiring, fuel shut-off solenoid, ECM
42	Fuel temperature sensor – voltage low/high	Wiring, fuel temperature sensor, ECM
43	Accelerator pedal position (APP) switch – voltage low/high	Wiring, APP switch, ECM
47	Crankshaft position (CKP) sensor – incorrect signal	Wiring, CKP sensor, ECM
48	Fuel quantity adjuster – malfunction	Wiring, APP switch, CMP sensor, ECM
55	No fault found	–



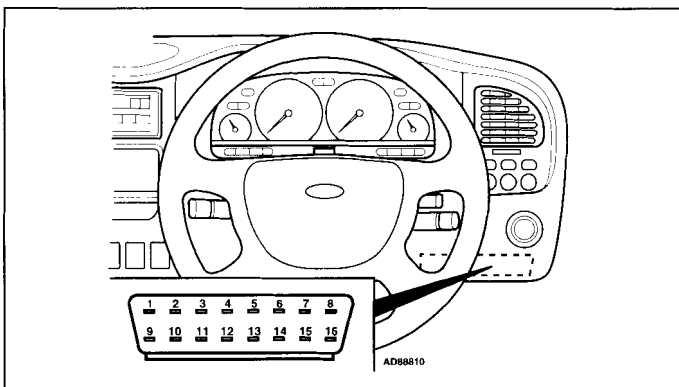


# FORD

Model: Transit 2,5 D Turbo  
 Year: 1994-00  
 Engine code: 4EB, 4EC, 4ED, 4GA/GB/GC/GD, 4GE/GF, 4HA, 4HD  
 System: Lucas EPIC

## Engine management

### Data link connector (DLC) locations



In fascia fusebox

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1108	Manifold absolute pressure (MAP) sensor – signal high	Wiring, MAP sensor, ECM
P1109	Manifold absolute pressure (MAP) sensor – signal low	Wiring, vacuum pipes, manifold leak, MAP sensor, ECM
P1170	Fuel shut-off solenoid	Wiring, fuses, fuel shut-off solenoid
P1171	Injection pump rotor position sensor	Wiring, injection pump rotor position sensor, ECM
P1172	Injection pump rotor position sensor/fuel quantity adjuster – excess fuel	Wiring, injection pump rotor position sensor, fuel quantity adjuster, ECM
P1173	Injection pump rotor position sensor	Wiring, injection pump rotor position sensor, ECM
P1174	Injection pump cam ring position sensor	Wiring, injection pump rotor position sensor, ECM
P1175	Fuel injection timing solenoid	Wiring, restricted fuel supply, dirty fuel, fuel injection timing solenoid, ECM
P1176	Injection pump cam ring position sensor	Wiring, injection pump cam ring position sensor, ECM
P1177	Injection pump position sensor	Wiring, injection pump position sensor, ECM
P1178	Injection pump position sensor	Wiring, injection pump fitted incorrectly, injection pump position sensor, ECM
P1180	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
P1181	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM



EOBD type	Fault location	Probable cause
P1182	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
P1183	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
P1184	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
P1185	Fuel temperature sensor – signal high	Wiring, fuel temperature sensor, ECM
P1186	Fuel temperature sensor – signal low	Wiring, fuel temperature sensor, ECM
P1187	Engine control module (ECM) – incorrect programming	ECM
P1189	Fuel injection pump – pump speed	Wiring, injection pump position sensor, fuel injection pump, ECM
P1190	Fuel injection pump – calibration	Wiring, calibration resistor, ECM
P1191	Engine control relay	Wiring, engine control relay
P1192	Engine control relay	Wiring, engine control relay
P1193	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid, ECM
P1195	Data transmission fault	ECM
P1196	Supply voltage – high	Wiring, alternator
P1197	Supply voltage – low	Wiring, fuses, alternator, engine control relay
P1198	Injection pump rotor position sensor/fuel quantity adjuster – insufficient fuel	Wiring, dirty fuel, fuel filter blocked, fuel pipes restricted, injection pump rotor position sensor, fuel quantity adjuster, ECM
P1252	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
P1253	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
P1254	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
P1255	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
P1256	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
P1257	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
P1258	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
P1300	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
P1301	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
P1302	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
P1306	Transmission kick-down relay 1 – no kick-down	Wiring, kick-down switch, kick-down relay
P1307	Transmission kick-down relay 2 – no kick-down	Wiring, kick-down switch, kick-down relay
P1308	AC compressor clutch relay	Wiring, AC compressor clutch relay
P1402	Exhaust gas recirculation (EGR) valve position sensor	Wiring, EGR valve, EGR valve position sensor, ECM
P1605	Engine control module (ECM)	ECM
P1606	Engine control module (ECM)	ECM
P1608	Engine control module (ECM)	ECM
P1644	Injection pump position sensor	Wiring, injection pump fitted incorrectly, injection pump position sensor
P9317	Battery voltage – high	Wiring, alternator, battery
P9318	Battery voltage – low	Wiring, alternator, battery
P9671	Battery voltage	Wiring, alternator, battery





**FORD**

Model:

Ka • Fiesta/Escort/Orion • Focus • Puma  
Mondeo • Scorpio • Galaxy • Cougar/Maverick  
Transit

Year:

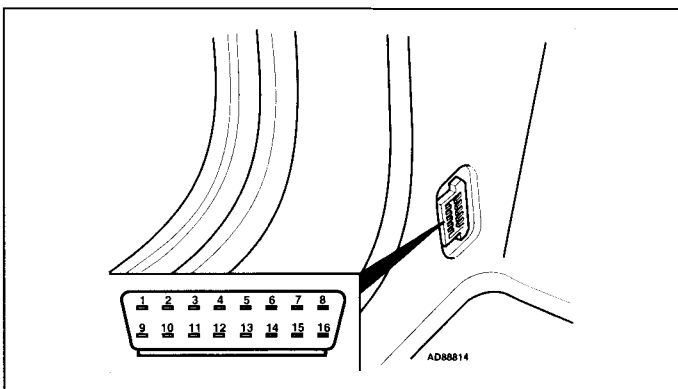
1993-02

System:

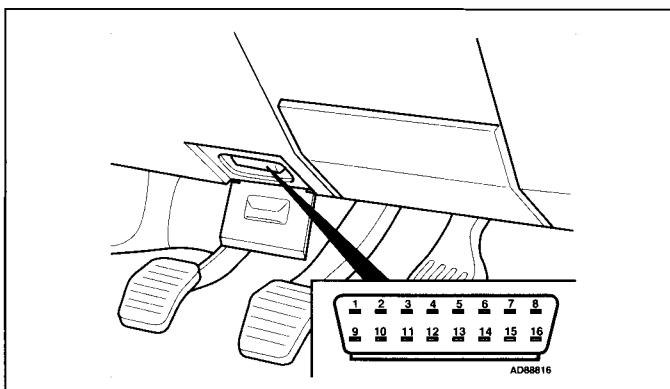
Ford PATS

Immobilizer

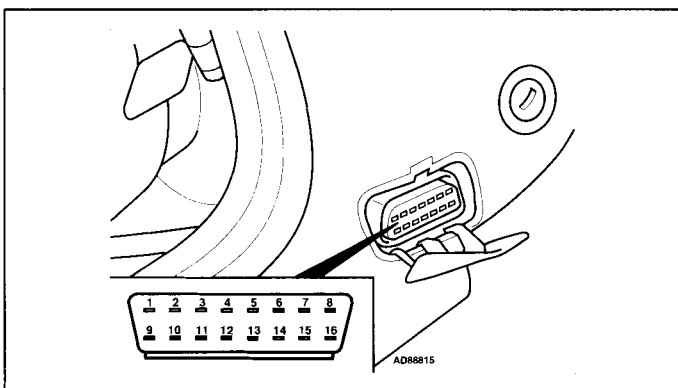
## Data link connector (DLC) locations



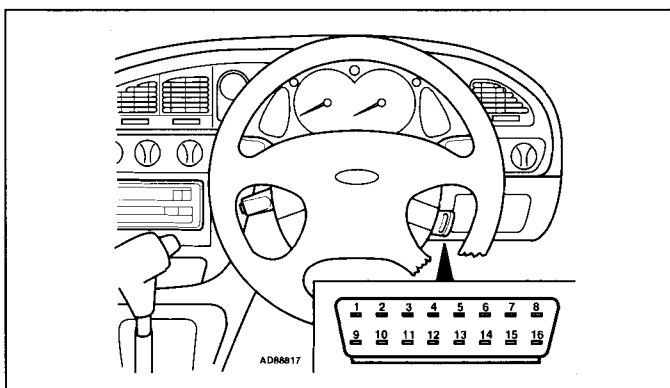
**Ka – LH kick panel**



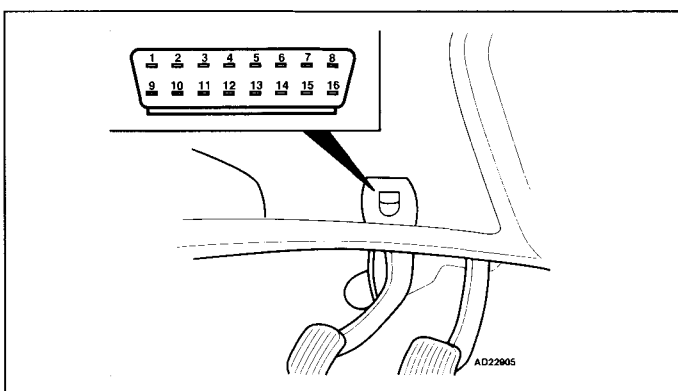
**Mondeo/Cougar**



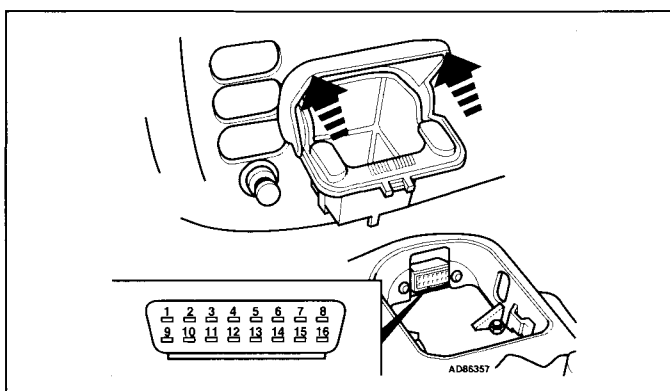
**Fiesta/Puma/Escort/Orion – LH kick panel**



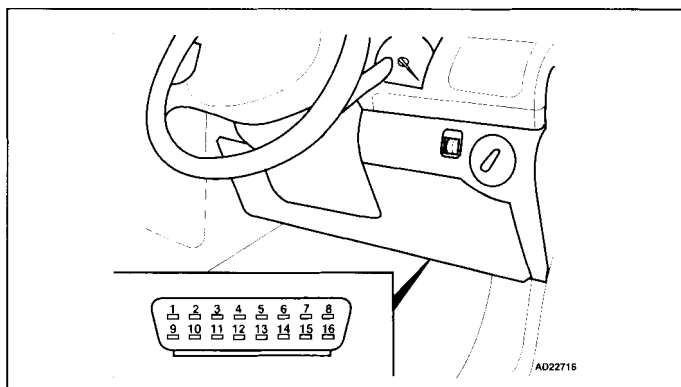
**Scorpio**



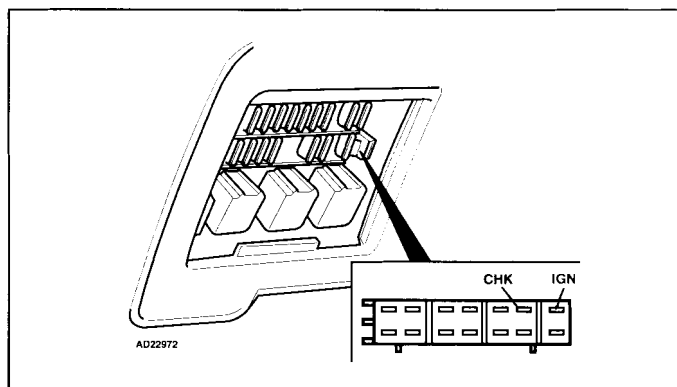
**Focus**



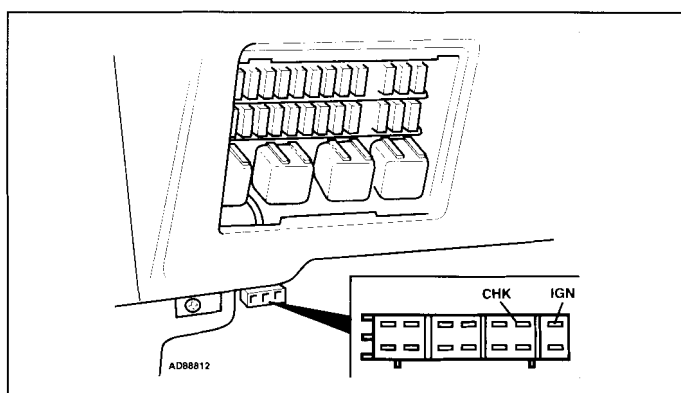
**Galaxy →05/00 – under ashtray**



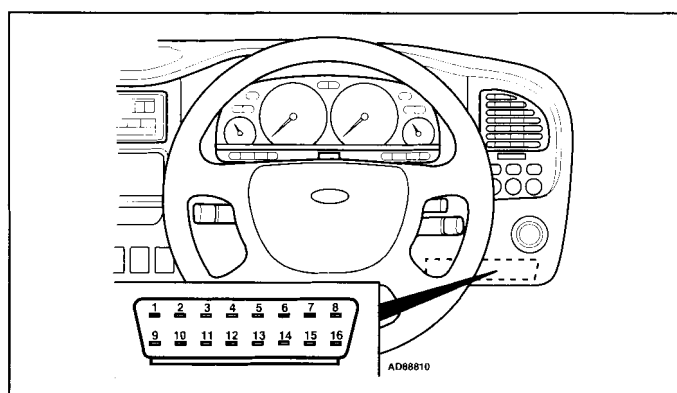
Galaxy 06/00 → – fascia, driver's side



Maverick 2,7 TD



Maverick 2,4



Transit – fascia fusebox

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the immobilizer warning lamp.

### Accessing

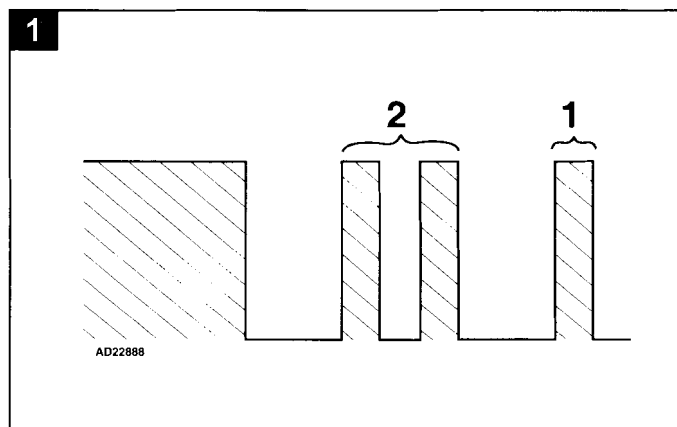
- Switch ignition ON.
- Immobilizer warning lamp illuminates.

**NOTE:** *Warning lamp location: In or adjacent to clock.*

- Warning lamp illuminates for approximately 3 seconds under normal conditions.
- If warning lamp flashes rapidly for approximately 1 minute: Vehicle is immobilized.
- If warning lamp illuminates for approximately 1 minute: Wait until warning lamp flashes.
- Count immobilizer warning lamp flashes.
- Note trouble codes.
- Compare with trouble code table.
- Each trouble code consists of two groups of flashes **1**.
- Trouble codes are repeated 10 times.

- For example: Trouble code 21 displayed **1**.
- After trouble code output, warning lamp will extinguish.
- Switch ignition OFF.
- More detailed fault diagnosis information is available by using diagnostic equipment connected to the data link connector (DLC) – 16-pin.

**NOTE:** *Trouble codes cannot be accessed using 3-pin data link connector (DLC).*



**FORD**Model: Ka • Fiesta/Escort/Orion • Focus • Puma • Mondeo  
Scorpio • Galaxy • Cougar/Maverick • Transit

## Immobilizer

## Trouble code identification

Flash type	EOBD type	Fault location	Probable cause
11	B1681	Immobilizer control module – not connected	Wiring, reader coil connections, immobilizer control module connections
12	B2103	Immobilizer control module – not working correctly	Immobilizer control module
13	B1600	Key code not received	Key partially obscured by other keys, key damaged or faulty
13	B2431	Ignition key programming failed	Ignition key
14	B1602	Partial key code received	Key partially obscured by other keys, key damaged or faulty
15	B1601	Key not programmed into immobilizer control module	Re-programme key, use different key
16	U1900	Faulty link between immobilizer control module and ECM	Wiring
21	B1213	Less than three keys programmed	Programme one or two more keys
22	B2141	ROM error (no ECM identification stored)	ECM
23	B2139	ECM identification mismatch	ECM
31	–	Code transmission error between immobilizer control module and ECM	Wiring, ECM programming
32	–	ECM/immobilizer control module communication – no response from ECM	Wiring, immobilizer control module
33	–	Communication error	Wiring, ECM, immobilizer control module



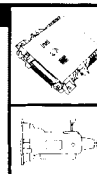
Model: Civic 1,4/1,5/1,6/1,8 • Civic Coupe 1,5/1,6  
Civic Aerodeck 1,4/1,5/1,6/1,8

Year: 1991-00

Engine code: B18C4, B16A2, D14A2, D14A3, D14A4, D14A5,  
D14A7, D14A8, D14Z1, D14Z2, D14Z3, D14Z4,  
D15B2, D15B7, D15Z1, D15Z3, D15Z6, D15Z8,  
B16A2, D16B2, D16Y2, D16Y3, D16Y5, D16Y7,  
D16Y8, D16W3, D16W4, D16Z6, D16Z7, D16Z9

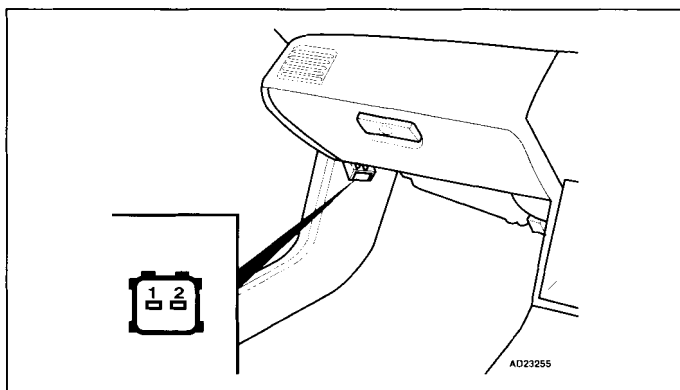
System: Honda PGM-FI

**HONDA**

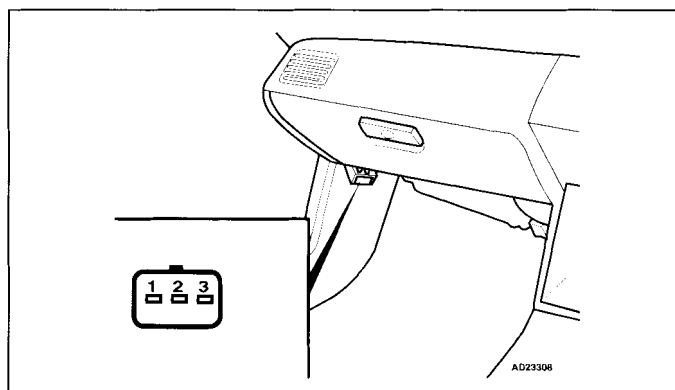


Engine management/transmission

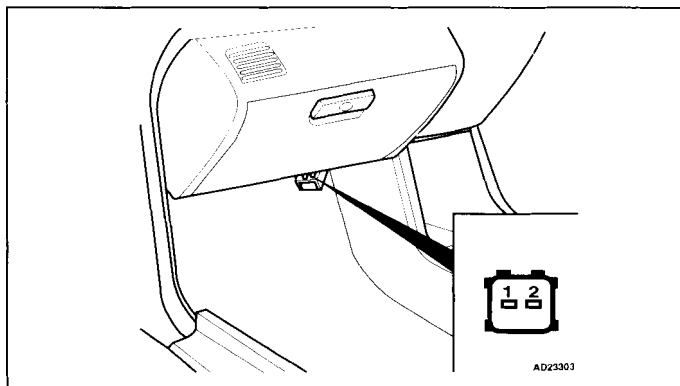
## Data link connector (DLC) locations



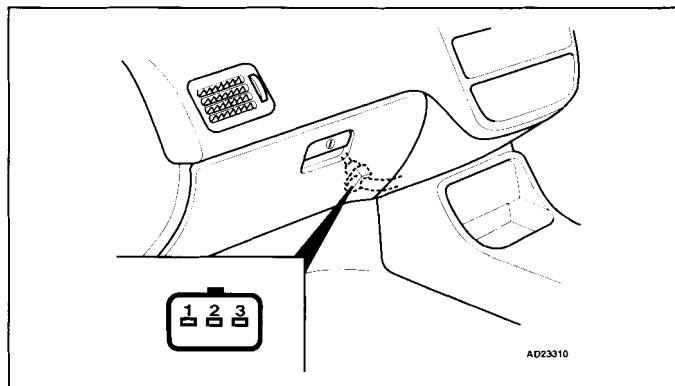
Type 1 – 2-pin



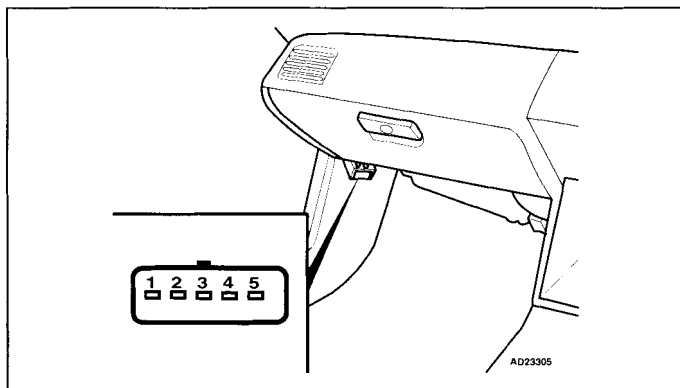
Type 4 – 3-pin



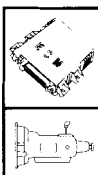
Type 2 – 2-pin



Type 5 – 3-pin



Type 3 – 5-pin



# HONDA

Model: Civic 1,4/1,5/1,6/1,8 • Civic Coupe 1,5/1,6  
Civic Aerodeck 1,4/1,5/1,6/1,8

## Engine management/transmission

### Trouble codes

**NOTE:** Engine control module (ECM) incorporates transmission control function.

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- Switch ignition ON. If MIL illuminates to indicate a fault but no trouble codes are stored, suspect DLC/MIL wiring, MIL or ECM.
- Some models 1997 →: The ECM fault memory can also be checked using diagnostic equipment connected to the 5-pin data link connector (DLC), type 3.
- All models 1999 →: The ECM fault memory can also be checked using diagnostic equipment connected to the 5-pin data link connector (DLC), type 3, or 3-pin data link connector (DLC), type 4 or 5.

#### Accessing

- Ensure ignition switched OFF.
- Bridge 2-pin data link connector (DLC) terminals – type 1 & 2 **1**.

**NOTE:** DO NOT bridge 3 or 5-pin data link connector (DLC) terminals.

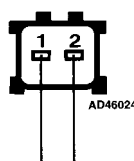
- Switch ignition ON.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.

**NOTE:** No trouble codes stored if MIL illuminates continuously.

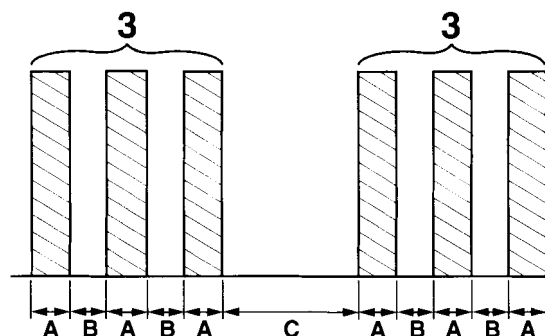
- Trouble codes 1-9 are indicated as follows:
  - Individual short flashes display trouble code **2** [A].
  - A short pause separates each flash **2** [B].
  - A long pause separates each trouble code **2** [C].
  - For example: Trouble code 3 displayed **2**.
- Trouble codes greater than 9 are indicated as follows:
  - Long flashes indicate the 'tens' of the trouble code **3** [A].
  - Short flashes indicate the 'units' of the trouble code **3** [C].
  - A short pause separates each flash **3** [B].
  - A long pause separates each trouble code **3** [D].
  - For example: Trouble code 12 displayed **3**.
- Switch ignition OFF.
- Rectify faults as necessary.

**NOTE:** If a trouble code is displayed but not listed in the trouble code table, suspect engine control module (ECM) fault.

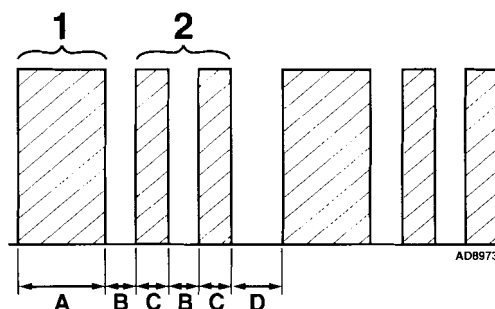
**1**



**2**



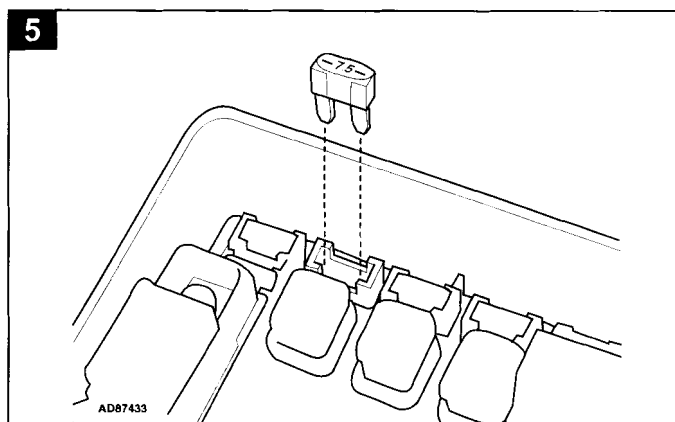
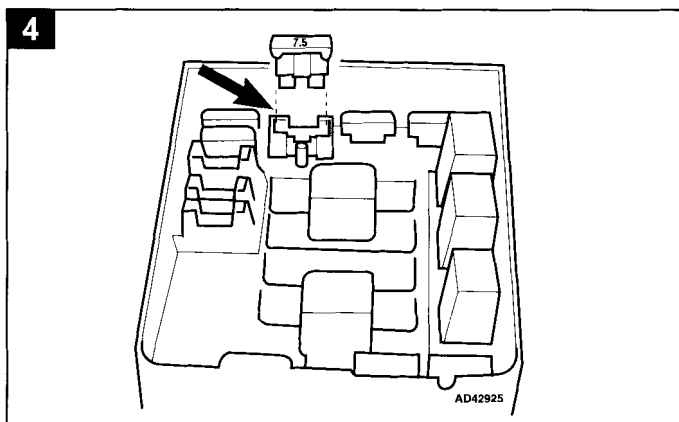
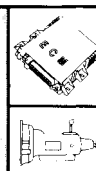
**3**



#### Erasing

- Switch ignition OFF.
  - Remove bridge wire.
  - Remove BACK UP (RADIO) fuse (7,5A) from underbonnet fusebox for 10 seconds minimum:
    - D14A2, D14A5, D14A7, D14A8, D15B2, D15B7, D15Z1, D15Z3, D15Z8, B16A2 → 1995, D16B2, D16Y2, D16Y3, D16Y7, D16Y8, D16Z6, D16Z7, D16Z9, B18C4 – **4**.
    - D14A3, D14A4, D15Z6, B16A2 1995 →, D16Y5 – **5**.
  - Refit fuse.
  - Trouble codes may also be erased by disconnecting battery lead.
- WARNING:** Disconnecting BACK UP fuse or battery may erase memory from electronic units (e.g. radio, clock).
- Repeat checking procedure to ensure no data remains in ECM fault memory.

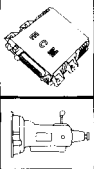




### Trouble code identification

Flash type	Fault location	Probable cause
1	Heated oxygen sensor (HO2S)/oxygen sensor (O2S)	Fuel pressure/pump, wiring short to earth/open circuit/short to positive, HO2S/O2S, ECM
3	Manifold absolute pressure (MAP) sensor – circuit	Wiring, supply voltage, MAP sensor, ECM
4	Engine speed (RPM) sensor	Wiring, RPM sensor, ECM
5	Manifold absolute pressure (MAP) sensor – signal	Intake leak, vacuum hose blocked, wiring, MAP sensor, ECM
6	Engine coolant temperature (ECT) sensor	Wiring short to earth/open circuit, ECT sensor, ECM
7	Throttle position (TP) sensor	Wiring short to earth/open circuit, TP sensor, ECM
8	Crankshaft position (CKP) sensor	CKP sensor, wiring short to earth/open circuit, ECM
9	Camshaft position (CMP) sensor	CMP sensor, wiring short to earth/open circuit, ECM
10	Intake air temperature (IAT) sensor	Wiring short to earth/open circuit, IAT sensor, ECM
12	Exhaust gas recirculation (EGR) system – control	Wiring, vacuum hose(s), EGR solenoid, EGR valve position sensor, EGR valve, ECM
14	Idle air control (IAC) valve – circuit	Wiring, supply voltage, IAC valve, ECM
15	Ignition amplifier – control circuit	Wiring, supply voltage, ignition amplifier, ECM
16	Injectors	Wiring, supply voltage, injector, ECM
17	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
19	Transmission lock-up solenoid	Wiring, solenoid, ECM
20	Electrical load sensor	Wiring, electrical load sensor, ECM
21	Camshaft position (CMP) actuator	Wiring, CMP actuator, ECM
22	Camshaft position (CMP) actuator oil pressure switch	Wiring, CMP actuator oil pressure switch, ECM
23	Knock sensor (KS)	Wiring, KS, ECM
41	Oxygen sensor heater – circuit malfunction	Wiring short to earth/open circuit/short to positive, HO2S, ECM
43	Heated oxygen sensor (HO2S)/fuel supply system – circuit malfunction	Wiring, fuel pressure/pump/filter, injector, HO2S, ECM
48	Heated oxygen sensor (HO2S) – circuit malfunction	Wiring, HO2S, ECM
54	Engine speed fluctuation sensor	Wiring, engine speed fluctuation sensor, ECM





# HONDA

Model:

Year:

Engine code:

System:

Civic 1,4 • Civic 1,6 • Civic 2,0 Type R  
Civic Coupe 1,7 • Accord 1,6 • Accord 1,8  
Accord 2,0 • Accord 2,2 • Accord 2,3  
Accord Coupe 2,0 • Accord Coupe 3,0

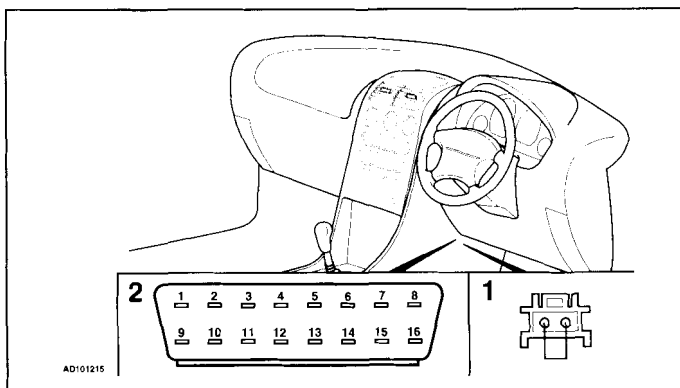
1998-04

D14Z5/Z6, D16B6/7, D16V1, D16W7, D17A2/8/9,  
F18B2/3/4, F20B5/6/7, F23Z5, H22A7, J30A1,  
K20A2/3

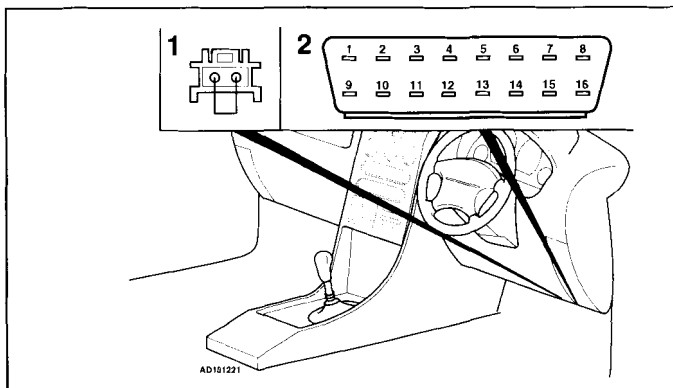
PGM-FI

Engine management/transmission

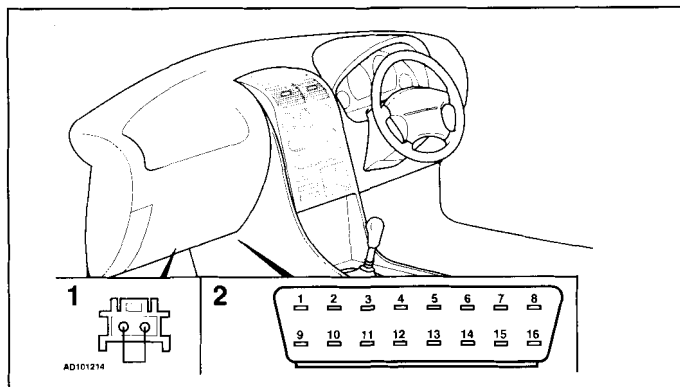
## Data link connector (DLC) locations



Civic



Accord Coupe



Accord

## Trouble codes

### General information

- ☐ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ☐ Engine control module (ECM) incorporates transmission control function.
- ☐ Accord 1,6/1,8 →1999: Data link connector (DLC) 2 not fitted. EOBD trouble codes not displayed.
- ☐ Flash type trouble codes can be displayed by the malfunction indicator lamp (MIL) with data link connector (DLC) 1 bridged.
- ☐ EOBD trouble codes can only be displayed by using diagnostic equipment connected to data link connector (DLC) 2.

### Accessing

- Ensure ignition switched OFF.
- Bridge terminals of data link connector (DLC) 1 **1**.
- Switch ignition ON.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.

**NOTE:** No trouble codes stored if MIL illuminates continuously.

- Trouble codes 1-9 are indicated as follows:
  - ☐ Individual short flashes display trouble code **2** [A].
  - ☐ A short pause separates each flash **2** [B].
  - ☐ A long pause separates each trouble code **2** [C].
  - ☐ For example: Trouble code 3 displayed **2**.

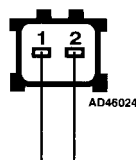


## Engine management/transmission

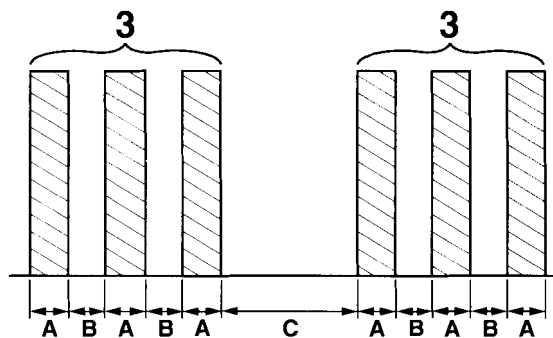
- Trouble codes greater than 9 are indicated as follows:
  - Long flashes indicate the 'tens' of the trouble code **3** [A].
  - Short flashes indicate the 'units' of the trouble code **3** [C].
  - A short pause separates each flash **3** [B].
  - A long pause separates each trouble code **3** [D].
  - For example: Trouble code 12 displayed **3**.
- Switch ignition OFF.
- Rectify faults as necessary.

**NOTE:** If a trouble code is displayed but not listed in the trouble code table, suspect engine control module (ECM) fault.

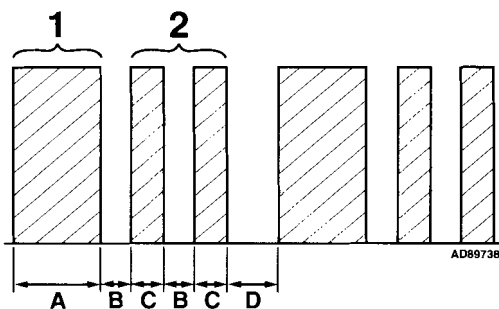
**1**



**2**



**3**



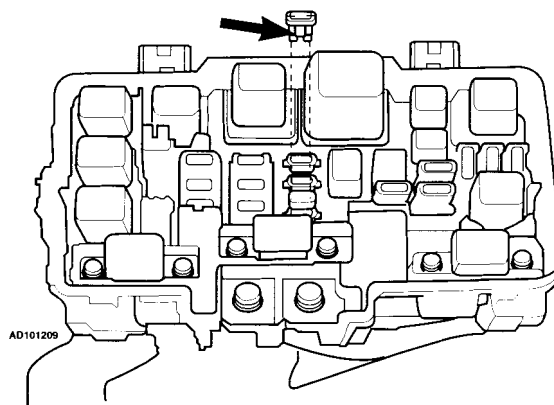
### Erasing

- Switch ignition OFF.
- Remove bridge wire.
- Civic:
  - Remove No.6 ECM fuse (15A) from underbonnet fuse box for 10 seconds minimum **4**.
- Accord 1,6:
  - Remove No.6 ECM fuse (7,5A) from passenger's side fascia fuse box for 10 seconds minimum **5**.
- Accord/Accord Coupe (except 1,6):
  - Remove No.13 RADIO BACK UP fuse (7,5A) from passenger's side fascia fuse box for 10 seconds minimum **6**.
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery lead.

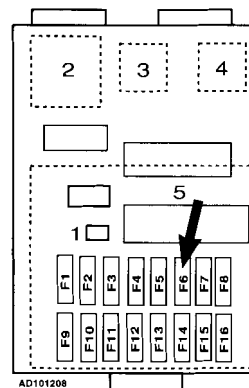
**WARNING:** Disconnecting BACK UP fuse or battery may erase memory from electronic units (e.g. radio, clock).

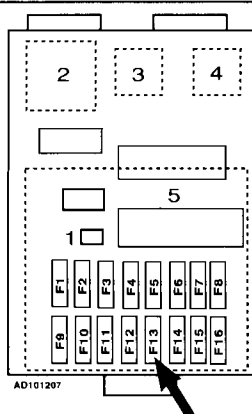
- Repeat checking procedure to ensure no data remains in ECM fault memory.
- The engine control module (ECM) fault memory can also be erased using diagnostic equipment connected to the data link connector (DLC).

**4**



**5**



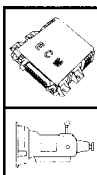
**HONDA**Model: Civic 1,4 • Civic 1,6 • Civic 2,0 Type R • Civic Coupe 1,7 • Accord 1,6 • Accord 1,8  
Accord 2,0 • Accord 2,2 • Accord 2,3 • Accord Coupe 2,0 • Accord Coupe 3,0**Engine management/transmission****6****Trouble code identification**

Flash type	EOBD type	Fault location	Probable cause
–	P0	Refer to EOBD trouble code table	–
1	–	Heated oxygen sensor (HO2S) 1, bank 1 – circuit/voltage low/high	Wiring open/short circuit, HO2S, fuel system, ECM
2	–	Vehicle speed sensor (VSS), MT – circuit malfunction/range/performance problem	Wiring, speedometer, VSS, ECM
3	–	Manifold absolute pressure (MAP) sensor – circuit/voltage high/low	Wiring, MAP sensor, ECM
4	–	Crankshaft position (CKP) sensor – circuit malfunction/range/performance problem	Wiring, CKP sensor, valve timing, ECM
6	–	Engine coolant temperature (ECT) sensor – circuit/voltage low/high	Wiring short/open circuit, ECT sensor, ECM
7	–	Throttle position (TP) sensor – circuit/voltage low/high	Wiring, TP sensor, ECM
8	P1359	Crankshaft position (CKP) sensor – connector disconnection	Wiring, ECM
8	P1361	Crankshaft position (CKP) sensor – intermittent signal	Wiring, CKP sensor, ECM
8	P1362	Crankshaft position (CKP) sensor – no signal	Wiring, CKP sensor, ECM
9	–	Camshaft position (CMP) sensor A, bank 1 – low/high input	Wiring short to earth/positive, CMP sensor, ECM
9	P1381	Camshaft position (CMP) sensor – intermittent signal	Wiring, CMP sensor, ECM
9	P1382	Camshaft position (CMP) sensor – no signal	Wiring, CMP sensor, ECM
10	–	Intake air temperature (IAT) sensor – circuit/voltage low/high	Wiring short/open circuit, IAT sensor, ECM
12	P1491	Exhaust gas recirculation (EGR) system – valve lift insufficient	Wiring, EGR valve/position sensor, ECM
12	P1498	Exhaust gas recirculation (EGR) valve position sensor – voltage high	Wiring, EGR valve/position sensor, ECM
13	P1107	Barometric pressure (BARO) sensor – circuit/voltage low	ECM
13	P1108	Barometric pressure (BARO) sensor – circuit/voltage high	ECM



Flash type	EOBD type	Fault location	Probable cause
14 <b>3</b>	1515	Idle control (IAC) valve – short circuit	Wiring, IAC valve, ECM
14 <b>3</b>	1516	Idle control (IAC) valve – short circuit	Wiring, IAC valve, ECM
14 <b>3</b>	1517	Idle control (IAC) valve – open circuit	Wiring, IAC valve, ECM
14	P1519	Idle air control (IAC) valve – circuit malfunction	Wiring, IAC valve, ECM
17	–	Vehicle speed sensor (VSS) – circuit malfunction/range/performance problem	Wiring, speedometer, VSS, ECM
20	P1297	Electrical load sensor – circuit/voltage low	Wiring short circuit, electrical load sensor, ECM
20	P1298	Electrical load sensor – circuit/voltage high	Wiring open circuit, electrical load sensor, ECM
22	P1259	VTEC system malfunction	Wiring, VTEC solenoid/pressure switch, ECM
23	–	Knock sensor (KS) – circuit malfunction	Wiring, KS, ECM
23	P1324	Knock sensor (KS) – circuit malfunction	Wiring, KS, ECM
34	–	System voltage – malfunction	Wiring, poor connection, battery, alternator
39	–	CAN data bus – malfunction	Wiring, connected system, ECM
41 <b>1</b>	–	Heated oxygen sensor (HO2S) 1, bank 1, heater control – circuit malfunction	Fuse, wiring, HO2S, ECM
41 <b>2</b>	P1166	Heated oxygen sensor (HO2S) 1, bank 1, heater control – circuit malfunction	Fuse, wiring, HO2S, ECM
41 <b>4</b>	P1166	Air fuel (A/F) ratio sensor – heater circuit problem	Wiring, A/F ratio sensor, ECM
41 <b>2</b>	P1167	Heated oxygen sensor (HO2S) 1, bank 1, heater control – system malfunction	Fuse, wiring, HO2S, ECM
41 <b>■</b>	P1167	Air fuel (A/F) ratio sensor – heater circuit malfunction	Wiring, A/F ratio sensor
45	–	System too lean/rich	Fuel system, HO2S, MAP sensor, contaminated fuel, valve clearance, exhaust leak
48 <b>5</b>	P1162	Heated oxygen sensor (HO2S) 1, bank 1 – circuit malfunction	Wiring, HO2S, ECM
48 <b>4</b>	P1157	Air fuel (A/F) ratio sensor – circuit malfunction	Wiring, A/F ratio sensor, ECM
48 <b>4</b>	P1158	Air fuel (A/F) ratio sensor – low voltage negative terminal	Wiring, A/F ratio sensor, ECM
48 <b>4</b>	P1159	Air fuel (A/F) ratio sensor – low voltage positive terminal	Wiring, A/F ratio sensor, ECM
56	–	Camshaft position (CMP) actuator, intake/left/front, bank 1 – circuit malfunction/timing over-advanced/system performance	Wiring, CMP actuator, ECM
57	–	Camshaft position (CMP) sensor A, bank 1 – circuit malfunction/range/performance problem	Insecure
61 <b>1</b>	–	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Heating inoperative, wiring, HO2S
61 <b>2</b>	P1149	Heated oxygen sensor (HO2S) 1, bank 1 – range/performance problem	HO2S
61 <b>2</b>	P1163	Heated oxygen sensor (HO2S) 1, bank 1 – circuit/slow response	HO2S, exhaust system
61 <b>2</b>	P1164	Heated oxygen sensor (HO2S) 1, bank 1 – range/performance problem	HO2S



**HONDA**Model: Civic 1,4 • Civic 1,6 • Civic 2,0 Type R • Civic Coupe 1,7 • Accord 1,6 • Accord 1,8  
Accord 2,0 • Accord 2,2 • Accord 2,3 • Accord Coupe 2,0 • Accord Coupe 3,0**Engine management/transmission**

Flash type	EOBD type	Fault location	Probable cause
61	P1165	Heated oxygen sensor (HO2S) 1, bank 1 – range/performance problem	HO2S
63	–	Heated oxygen sensor (HO2S) 2, bank 1 – slow response/circuit/voltage low/high	Wiring, HO2S, ECM
65	–	Heated oxygen sensor (HO2S) 2, bank 1, heater control – circuit malfunction	Wiring, HO2S, ECM
67	–	Catalytic converter system, bank 1 – efficiency below threshold	Catalytic converter, wiring, HO2S 2
70	–	AT – lock-up clutch not engaging/no gear shift	Wiring, mainshaft speed sensor, countershaft speed sensor, lock-up control system, shift solenoid (SS) A/B/C, ECM, TCM
70	P1705	AT – gear shift malfunction	Wiring, range position switch, ECM
70	P1706	Automatic transmission	Wiring, range position switch, ECM
–	P1709	AT – manual mode selection malfunction	Wiring, range position switch, ECM
70	P1738	Automatic transmission	Wiring, clutch pressure switch 2, ECM
70	P1739	Automatic transmission	Wiring, clutch pressure switch 3, ECM
70	P1753	AT – lock-up clutch not engaging/disengaging	Wiring, lock-up control solenoid, ECM
70	P1768	AT – no gear shift	Wiring, clutch pressure control solenoid A, ECM
70	P1768	AT – lock-up clutch not engaging	Wiring, clutch pressure control solenoid A, ECM
70	P1773	AT – no gear shift	clutch pressure control solenoid B, ECM
70	P1773	AT – lock-up clutch not engaging	clutch pressure control solenoid B, ECM
70	P1791	Automatic transmission – malfunction	–
71	–	Cylinder No.1 – misfire	Fuel/ignition/VTEC system, injector, wiring, mechanical fault
72	–	Cylinder No.2 – misfire	Fuel/ignition/VTEC system, injector, wiring, mechanical fault
73	–	Cylinder No.3 – misfire	Fuel/ignition/VTEC system, injector, wiring, mechanical fault
74	–	Cylinder No.4 – misfire	Fuel/ignition/VTEC system, injector, wiring, mechanical fault
80	–	Exhaust gas recirculation (EGR) system – insufficient flow	EGR valve, EGR solenoid, hose leak/blockage
86	–	Engine coolant temperature (ECT) sensor – range/performance problem	ECT sensor, cooling system
92	–	Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring, EVAP valve, ECM
–	P1607	Engine control module (ECM) – internal circuit failure A	ECM

**1** Civic, Accord H22A7 & D16B6 2001 →**2** Accord F20B6**3** Accord D16B6 2001 →**4** Civic 5dr 2003 →**5** Except Civic 5dr 2003 →

Model: Accord 1,8/2,0/2,2/2,3  
 Accord Aerodeck/Coupe 2,0/2,2

Year: 1993-98

Engine code: F18A3, F20B3, F20B5, F20Z1, F20Z2, F20Z3,  
 F22B5, F22Z2, H23A3

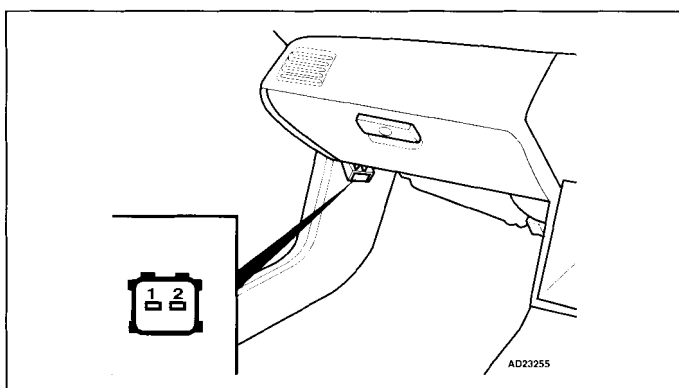
System: Honda PGM-FI

**HONDA**



Engine management

## Data link connector (DLC) locations



## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- Switch ignition ON. If MIL illuminates to indicate a fault but no trouble codes are stored, suspect DLC/MIL wiring, MIL or ECM.

### Accessing

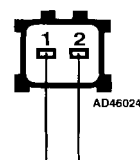
- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals **1**.
- Switch ignition ON.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.

**NOTE: No trouble codes stored if MIL illuminates continuously.**

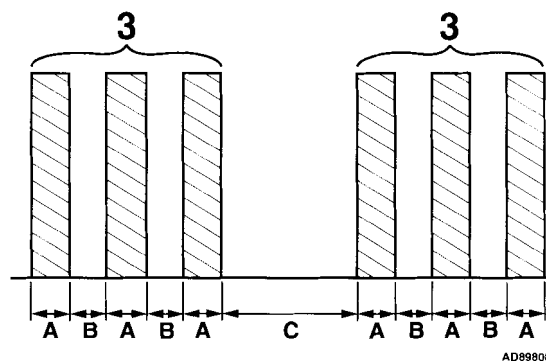
- Trouble codes 1-9 are indicated as follows:
  - Individual short flashes display trouble code **2** [A].
  - A short pause separates each flash **2** [B].
  - A long pause separates each trouble code **2** [C].
  - For example: Trouble code 3 displayed **2**.
- Trouble codes greater than 9 are indicated as follows:
  - Long flashes indicate the 'tens' of the trouble code **3** [A].
  - Short flashes indicate the 'units' of the trouble code **3** [C].
  - A short pause separates each flash **3** [B].
  - A long pause separates each trouble code **3** [D].
  - For example: Trouble code 12 displayed **3**.
- Switch ignition OFF.
- Rectify faults as necessary.

**NOTE: If a trouble code is displayed but not listed in the trouble code table, suspect engine control module (ECM) fault.**

**1**



**2**

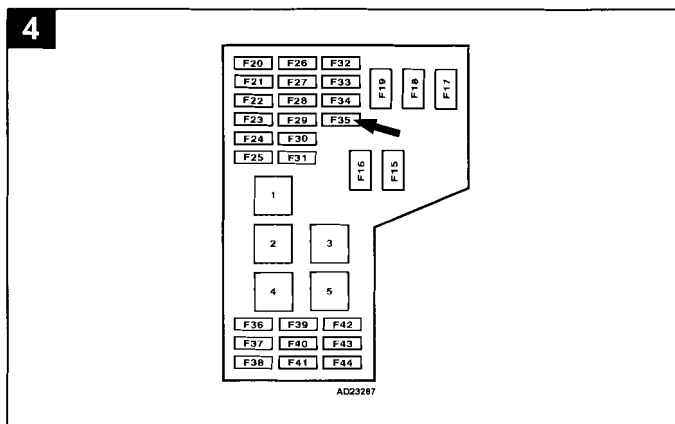
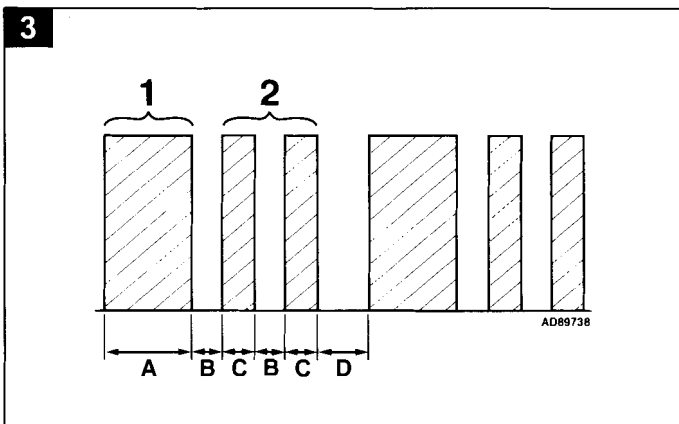




# HONDA

Model: Accord 1,8/2,0/2,2/2,3 • Accord Aerodeck/Coupe 2,0/2,2

## Engine management



### Erasing

- Switch ignition OFF.
- Remove bridge wire.
- Remove BACK UP fuse (7,5A) from underbonnet fusebox for 10 seconds minimum:

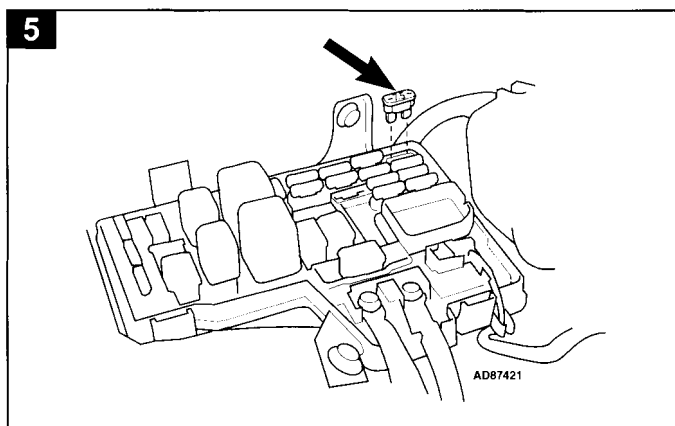
□ F18A3, F20Z1, F20Z2, F22Z2, H23A3 – **4**.

□ F20B3, F22B5 – **5**.

- Refit fuse.
- Trouble codes may also be erased by disconnecting battery lead.

**WARNING:** *Disconnecting BACK UP fuse or battery may erase memory from electronic units (e.g. radio, clock).*

- Repeat checking procedure to ensure no data remains in ECM fault memory.



### Trouble code identification

Flash type	Fault location	Probable cause
1	Heated oxygen sensor (HO2S)/oxygen sensor (O2S)	Fuel pressure/pump, wiring short to earth/open circuit/short to positive, HO2S/O2S, ECM
3	Manifold absolute pressure (MAP) sensor – circuit	Wiring, supply voltage, MAP sensor, ECM
4	Engine speed (RPM) sensor	Wiring, RPM sensor, ECM
5	Manifold absolute pressure (MAP) sensor – signal	Intake leak, vacuum hose blocked, wiring, MAP sensor, ECM
6	Engine coolant temperature (ECT) sensor	Wiring short to earth/open circuit, ECT sensor, ECM
7	Throttle position (TP) sensor	Wiring short to earth/open circuit, TP sensor, ECM
8	Crankshaft position (CKP) sensor	CKP sensor, wiring short to earth/open circuit, ECM
9	Camshaft position (CMP) sensor	CMP sensor, wiring short to earth/open circuit, ECM
10	Intake air temperature (IAT) sensor	Wiring short to earth/open circuit, IAT sensor, ECM
12	Exhaust gas recirculation (EGR) system – control	Wiring, vacuum hose(s), EGR solenoid, EGR valve position sensor, EGR valve, ECM
13	Barometric pressure (BARO) sensor	ECM
14	Idle air control (IAC) valve – circuit	Wiring, supply voltage, IAC valve, ECM
15	Ignition amplifier – control circuit	Wiring, supply voltage, ignition amplifier, ECM
17	Vehicle speed sensor (VSS)	Wiring, VSS, ECM



Model: Accord 1,8/2,0/2,2/2,3 • Accord Aerodeck/Coupe 2,0/2,2

**HONDA**



Engine management

Flash type	Fault location	Probable cause
21	Camshaft position (CMP) actuator	Wiring, CMP actuator, ECM
30	Transmission control module (TCM) to engine control module (ECM) signal A – circuit malfunction	Wiring, TCM, ECM
31	Transmission control module (TCM) to engine control module (ECM) signal B – circuit malfunction	Wiring, TCM, ECM
41	Oxygen sensor heater – circuit malfunction	Wiring short to earth/open circuit/short to positive, HO2S, ECM
43	Heated oxygen sensor (HO2S)/fuel supply system – circuit malfunction	Wiring, fuel pressure/pump/filter, injector, HO2S, ECM



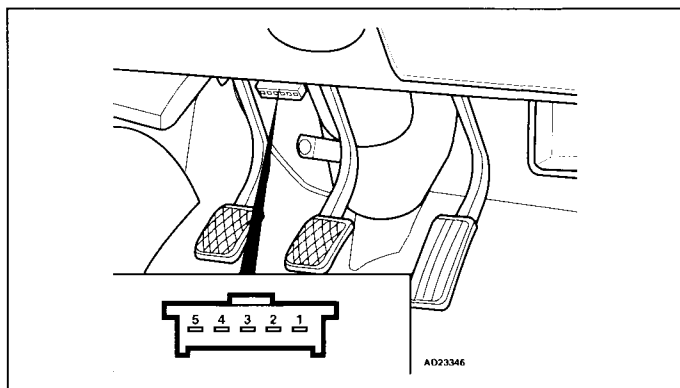


# HONDA

Model: Accord 2,0 TD  
 Year: 1996-98  
 Engine code: 20T2N  
 System: Bosch MSA 11

## Engine management

### Data link connector (DLC) locations



### Trouble codes

#### General information

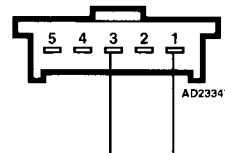
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

**NOTE:** If a trouble code is displayed but not listed in the trouble code table, suspect engine control module (ECM) fault.

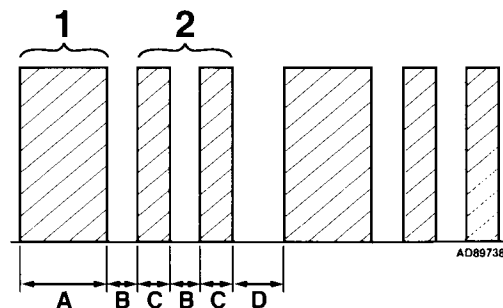
#### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 1 and 3 **1**.
- Switch ignition ON. DO NOT start engine.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Trouble codes are indicated as follows:
  - Long flashes indicate the 'tens' of the trouble code **2** [A].
  - Short flashes indicate the 'units' of the trouble code **2** [C].
  - A short pause separates each flash **2** [B].
  - A long pause separates each trouble code **2** [D].
- For example: Trouble code 12 displayed **2**.
- Switch ignition OFF.
- Remove bridge wire.

**1**



**2**



#### Erasing

- Switch ignition ON.
- Switch ignition OFF.
- Repeat approximately 50 times.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

**Trouble code identification**

Flash type	Fault location	Probable cause
12	Start of diagnosis	–
14	Engine coolant temperature (ECT) sensor – low voltage	Wiring short to earth, supply voltage, ECT sensor, ECM
15	Engine coolant temperature (ECT) sensor – high voltage	Wiring open circuit/short to positive, ECT sensor, ECM
16	Fuel temperature sensor – low voltage	Wiring short to earth, supply voltage, fuel temperature sensor, ECM
17	Fuel temperature sensor – high voltage	Wiring open circuit/short to positive, fuel temperature sensor, ECM
19	Crankshaft position (CKP) sensor – implausible signal	Wiring short to earth/open circuit, CKP sensor, ECM
21	Accelerator pedal position (APP) sensor – high voltage	Wiring short to earth/open circuit/short to positive, APP sensor, ECM
22	Accelerator pedal position (APP) sensor – low voltage	Wiring short to earth/open circuit, APP sensor, ECM
23	Accelerator pedal position (APP) sensor – implausible signal	Wiring short to earth/open circuit/short to positive, APP sensor, ECM
24	Vehicle speed sensor (VSS) – implausible signal	Wiring short to earth/open circuit/short to positive, supply voltage, VSS, ECM
27	Mass air flow (MAF) sensor – low voltage	Wiring short to earth/open circuit, supply voltage, earth connection, MAF sensor, ECM
28	Mass air flow (MAF) sensor – high voltage	Wiring short to earth/open circuit/short to positive, earth connection, MAF sensor, ECM
29	Mass air flow (MAF) sensor – implausible signal	Wiring short to earth/open circuit/short to positive, supply voltage, earth connection, MAF sensor, intake leak, ECM
31	Crankshaft position (CKP) sensor – no signal	Wiring short to earth/open circuit, CKP sensor, ECM
33	Exhaust gas recirculation (EGR) system	Hoses blocked/leaking, wiring short to earth/open circuit, EGR solenoid, EGR valve, vacuum pump, MAF sensor/wiring, ECM
34	Fuel injection timing solenoid	Wiring open circuit, supply voltage, fuel injection timing solenoid, ECM
37	Brake pedal position (BPP) switch – implausible signal	Fuse, wiring open circuit/short to positive, supply voltage, BPP switch, ECM
39	Alarm system	Alarm system defective
41	Manifold absolute pressure (MAP) sensor – low voltage	Wiring short to earth/open circuit, MAP sensor, ECM
42	Manifold absolute pressure (MAP) sensor – high voltage	Wiring open circuit/short to positive, MAP sensor, ECM
43	Manifold absolute pressure (MAP) sensor – implausible signal	Wiring short to earth/open circuit/short to positive, supply voltage, MAP sensor, ECM
48	Battery – low voltage	Earth connection, battery, alternator
54	Fuel shut-off solenoid – defective	Wiring short to positive, fuel shut-off solenoid
55	Engine control module (ECM)	Wiring, supply voltage, earth connection, ECM
61	Fuel quantity adjuster position sensor – high/low voltage	Wiring short to earth/open circuit/short to positive, fuel quantity adjuster position sensor, ECM

**HONDA**

Model: Accord 2,0 TD

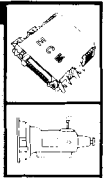
**Engine management**

Flash type	Fault location	Probable cause
62	Fuel quantity adjuster position sensor – implausible signal	Wiring open circuit, fuel quantity adjuster position sensor, ECM
64	Fuel quantity adjuster	Wiring short to earth/open circuit, fuel quantity adjuster, ECM
71	Intake air temperature (IAT) sensor – low voltage	Wiring short to earth/open circuit, IAT sensor, ECM
72	Intake air temperature (IAT) sensor – high voltage	Wiring open circuit/short to positive, IAT sensor, ECM
81	Injector needle lift sensor – no signal	Wiring short to earth/open circuit/short to positive, injector needle lift sensor, ECM
82	Injector needle lift sensor – implausible signal	Wiring short to earth/open circuit/short to positive, injector needle lift sensor, CKP sensor, ECM



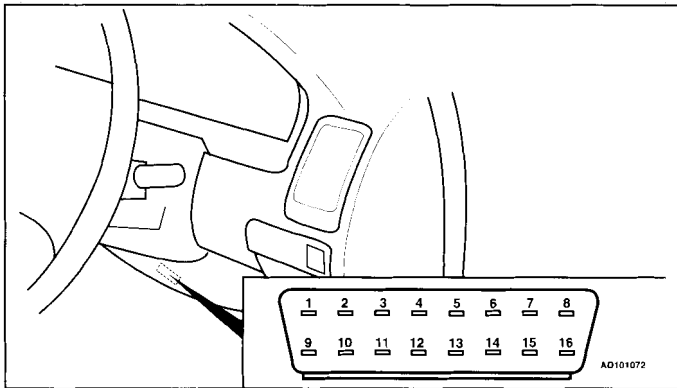
Model: CR-V 2,0 • CR-V 2,4  
 Year: 2002-04  
 Engine code: K20A4, K20A5, K24A1  
 System: PGM-FI

**HONDA**



## Engine management/transmission

### Data link connector (DLC) locations



### Trouble codes

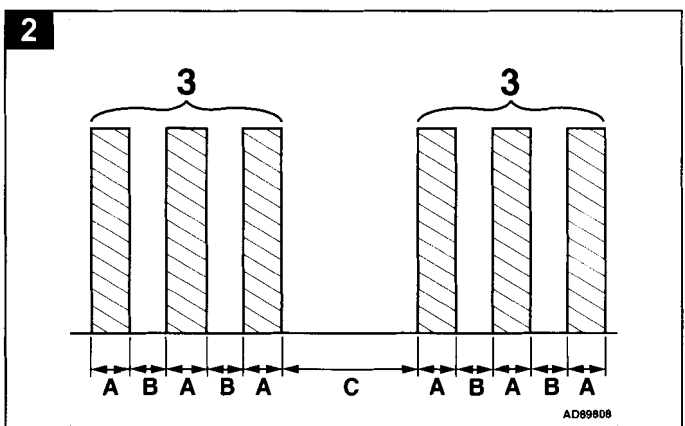
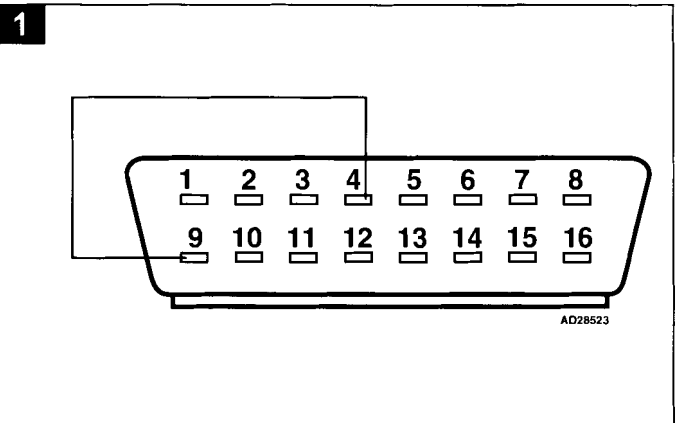
#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Engine management trouble codes can be displayed by the malfunction indicator lamp (MIL) with the data link connector (DLC) terminals bridged.
- Automatic transmission (AT) trouble codes can be displayed by the transmission selector lamp 'D' with the data link connector (DLC) terminals bridged.
- Trouble codes can also be displayed by using diagnostic equipment connected to the data link connector (DLC).

#### Accessing

- Ensure ignition switched OFF.
  - Bridge data link connector (DLC) terminals 4 and 9 **1**.
  - Switch ignition ON.
  - Check that MIL flashes.
  - AT: Transmission selector lamp 'D' may also flash.
- NOTE: No trouble codes stored if MIL illuminates continuously.**
- Trouble codes 1-9 are indicated as follows:
    - Individual short flashes display trouble code **2** [A].
    - A short pause separates each flash **2** [B].
    - A long pause separates each trouble code **2** [C].
    - For example: Trouble code 3 displayed **2**.
  - Trouble codes greater than 9 are indicated as follows:
    - Long flashes indicate the 'tens' of the trouble code **3** [A].
    - Short flashes indicate the 'units' of the trouble code **3** [C].
    - A short pause separates each flash **3** [B].
    - A long pause separates each trouble code **3** [D].
    - For example: Trouble code 12 displayed **3**.
  - Count lamp flashes. Compare with trouble code table.
  - Switch ignition OFF.
  - Remove bridge wire.

**NOTE: More detailed fault diagnosis information is obtained when using diagnostic equipment.**

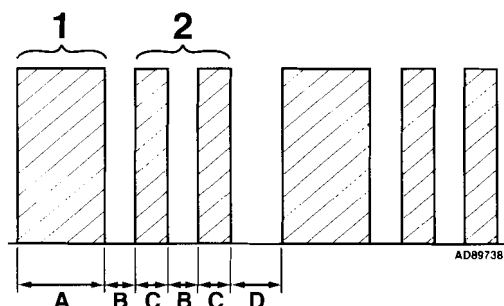
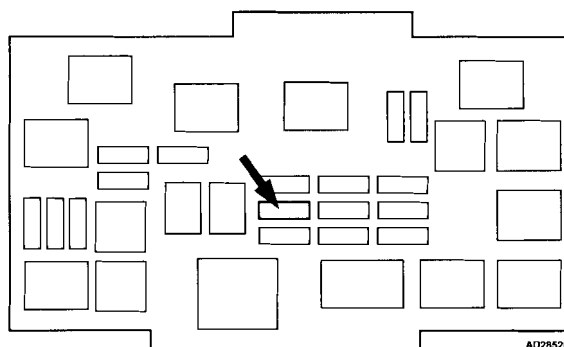


**HONDA**

Model: CR-V 2,0 • CR-V 2,4



Engine management/transmission

**3****4****Erasing**

- Switch ignition OFF.
- Remove No.6 ECM fuse (15A) from underbonnet fusebox for 10 seconds minimum **4**.
- Refit fuse.
- Repeat checking procedure to ensure no data remains in ECM fault memory.
- The engine control module (ECM) fault memory can also be erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification – EOBD type**

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1107	Barometric pressure (BARO) sensor – voltage low	ECM
P1108	Barometric pressure (BARO) sensor – voltage high	ECM
P1213	Mixture adjustment resistor – voltage low	Wiring short/open circuit, IAT sensor, ECM
P1214	Mixture adjustment resistor – voltage high	Wiring short/open circuit, IAT sensor, ECM
P1253	VTEC system – malfunction	Wiring, VTEC solenoid, VTEC pressure switch, ECM
P1259	VTEC system – malfunction	Wiring, VTEC solenoid, VTEC pressure switch, ECM
P1297	Electrical load sensor – voltage low	Wiring short circuit, electrical load sensor, ECM
P1298	Electrical load sensor – voltage high	Wiring open circuit, electrical load sensor, ECM
P1361	Crankshaft position (CKP) sensor – intermittent signal	Wiring, CKP sensor, ECM
P1362	Crankshaft position (CKP) sensor – no signal	Wiring, CKP sensor, ECM
P1519	Idle air control (IAC) valve – circuit malfunction	Wiring, IAC valve, ECM
P1607	Engine control module (ECM) – internal malfunction	ECM
P1705	Transmission range (TR) switch – short circuit	Wiring, TR switch, ECM
P1706	Transmission range (TR) switch – open circuit	Wiring, TR switch, ECM
P1717	Transmission range (TR) switch – incorrect signal	Wiring, TR switch, ECM

**Trouble code identification – flash type**

Flash type	Fault location	Probable cause
1	Heated oxygen sensor (HO2S) 1 – voltage low/high	Wiring open/short circuit, HO2S, fuel system, ECM
3	Manifold absolute pressure (MAP) sensor – voltage low/high	Wiring, MAP sensor, ECM
4	Crankshaft position (CKP) sensor – intermittent/no signal	Wiring, CKP sensor, valve timing, ECM
5	Transmission range (TR) switch – short circuit	Wiring, TR switch, ECM
6	Engine coolant temperature (ECT) sensor – voltage low/high	Wiring short/open circuit, ECT sensor, ECM
6	AT: Transmission range (TR) switch – open circuit	Wiring, TR switch, ECM
7	Throttle position (TP) sensor – voltage low/high	Wiring, TP sensor, ECM
7	AT: Shift solenoid (SS) A – electrical	Wiring, SS, ECM
8	Crankshaft position (CKP) sensor – intermittent/no signal	Wiring, CKP sensor, ECM
8	AT: Shift solenoid (SS) B – electrical	Wiring, SS, ECM
9	Vehicle speed sensor (VSS) – circuit malfunction	Wiring, VSS, ECM
10	Intake air temperature (IAT) sensor – voltage low/high	Wiring short/open circuit, IAT sensor, ECM
11	Mixture adjustment resistor – voltage low/high	Wiring short/open circuit, IAT sensor, ECM
13	Barometric pressure (BARO) sensor – voltage low/high	ECM
14	Idle air control (IAC) valve – circuit malfunction	Wiring, IAC valve, ECM
15	Turbine shaft speed (TSS) sensor – circuit malfunction	Wiring, TSS sensor, ECM
16	Transmission fluid pressure (TFP) solenoid – electrical	Wiring, TFP solenoid, ECM
17	Vehicle speed sensor (VSS) – circuit malfunction	Wiring, vehicle speedometer, VSS, ECM
20	Electrical load sensor – voltage low/high	Wiring short circuit, electrical load sensor, ECM
21	VTEC system – malfunction	Wiring, VTEC solenoid, VTEC pressure switch, ECM
22	VTEC system – malfunction	Wiring, VTEC solenoid, VTEC pressure switch, ECM
22	AT: Shift solenoid (SS) C – electrical	Wiring, SS, ECM
23	Knock sensor (KS) – circuit malfunction	Wiring, KS, ECM
23	AT: Pressure control solenoid B – electrical malfunction	Wiring, pressure control solenoid, ECM
25	Transmission fluid pressure (TFP) switch, 2nd clutch – circuit malfunction	Wiring, poor connection, TFP switch, ECM
26	Transmission fluid pressure (TFP) switch, 3rd clutch – circuit malfunction	Wiring, poor connection, TFP switch, ECM
28	Transmission fluid temperature (TFT) sensor – circuit malfunction	Wiring, TFT sensor, ECM
29	Transmission fluid pressure (TFP) solenoid C – electrical malfunction	Wiring, poor connection, TFP solenoid, ECM
34	Engine control module (ECM) supply voltage	Wiring, poor connection, battery, alternator
41	Heated oxygen sensor (HO2S) 1 – heater circuit malfunction	Fuse, wiring, HO2S, ECM



**HONDA**

Model: CR-V 2,0 • CR-V 2,4

**Engine management/transmission**

Flash type	Fault location	Probable cause
45	Mixture too lean/rich	Fuel system, front HO2S, injectors, MAP sensor, wiring, mechanical fault
45	AT: Gear selection – shift malfunction	Wiring, TR sensor, shift solenoids, transmission mechanical fault
56	Camshaft position (CMP) actuator – circuit/system malfunction	Wiring, valve timing, engine mechanical fault, CMP actuator, ECM
57	Camshaft position (CMP) sensor – intermittent/no signal	Insecure sensor/rotor, air gap, wiring, poor connection, CMP sensor, ECM
61	Heated oxygen sensor (HO2S) 1 – slow response	HO2S, exhaust system
61	AT: Shift solenoid (SS) E – electrical	Wiring, SS, ECM
62	Transmission range (TR) switch – incorrect signal	Wiring, TR switch, ECM
63	Heated oxygen sensor (HO2S) 2 – voltage low/high	Wiring, HO2S, ECM
65	Heated oxygen sensor (HO2S) 2 – heater circuit malfunction	Wiring, HO2S, ECM
67	Catalytic converter – efficiency below threshold	Catalytic converter, HO2S 2
70	Shift solenoid (SS) A – circuit malfunction	Wiring, SS, ECM
71	Cylinder 1 – misfire	Ignition/fuel system/VTEC system, injector, wiring, mechanical fault
72	Cylinder 2 – misfire	Ignition/fuel system/VTEC system, injector, wiring, mechanical fault
73	Cylinder 3 – misfire	Ignition/fuel system/VTEC system, injector, wiring, mechanical fault
74	Cylinder 4 – misfire	Ignition/fuel system/VTEC system, injector, wiring, mechanical fault
76	Transmission fluid pressure (TFP) solenoid – circuit malfunction	Wiring, TFP solenoid, ECM
77	Pressure control solenoid B – malfunction	Pressure control solenoid
78	AT: Transmission fluid pressure (TFP) solenoid C – circuit malfunction	Wiring, poor connection, TFP solenoid, ECM
92	Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring, EVAP canister purge valve, ECM





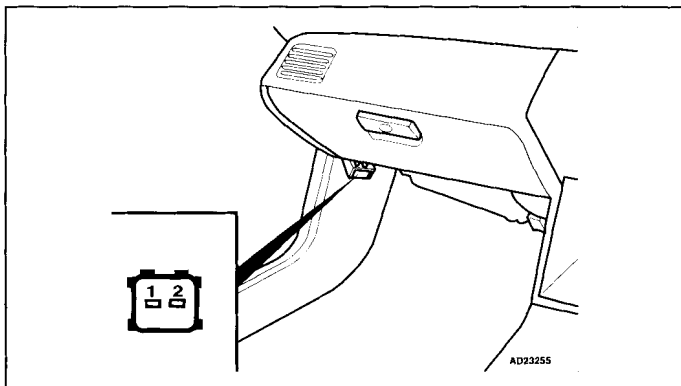
Model: Accord 1,8/2,0/2,2/2,3  
 Accord Aerodeck/Coupe 2,0/2,2  
 Year: 1993-98  
 Engine code: F18A3, F20B3, F20Z1, F20Z2, F20Z3, F22B5, H23A3  
 System: Honda PGM-FI

**HONDA**



Transmission

## Data link connector (DLC) locations



Kick panel, passenger's side

## Trouble codes

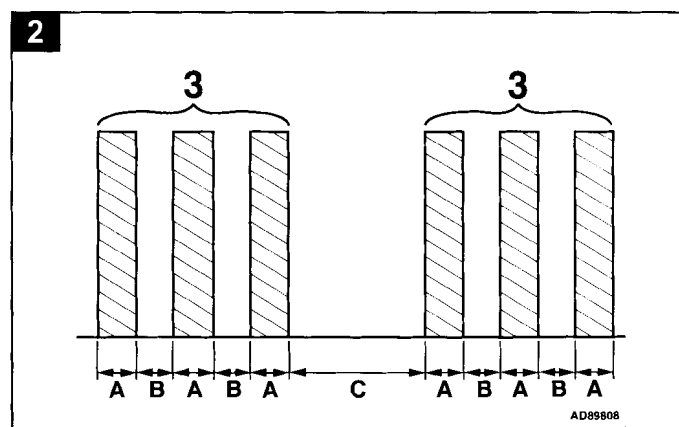
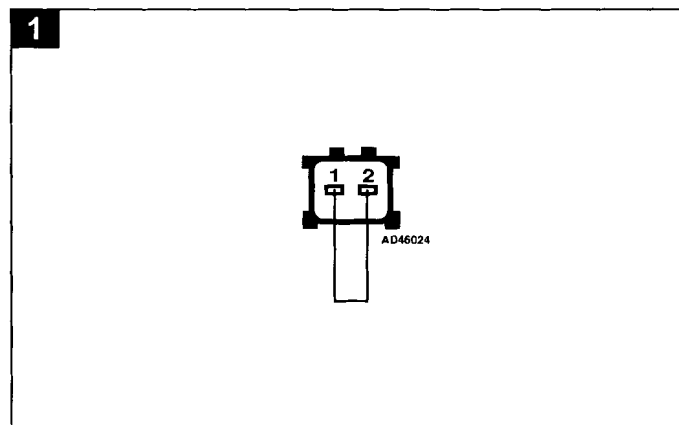
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- F18A3, F20Z1, F20Z2, H23A3 → 1995: Trouble codes are displayed by the 'S' (sport) indicator lamp.
- Except F18A3, F20Z1, F20Z2, H23A3 → 1995: Trouble codes are displayed by the 'D4' indicator lamp.

**NOTE:** If a trouble code is displayed but not listed in the trouble code table, suspect transmission control module (TCM) fault.

### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals **1**.
- Switch ignition ON.
- Count transmission indicator lamp flashes. Note trouble codes. Compare with trouble code table.
- Trouble codes 1-9 are indicated as follows:
  - Individual short flashes display trouble code **2** [A].
  - A short pause separates each flash **2** [B].
  - A long pause separates each trouble code **2** [C].
  - For example: Trouble code 3 displayed **2**.
- Trouble codes greater than 9 are indicated as follows:
  - Long flashes indicate the 'tens' of the trouble code **3** [A].
  - Short flashes indicate the 'units' of the trouble code **3** [C].
  - A short pause separates each flash **3** [B].
  - A long pause separates each trouble code **3** [D].
  - For example: Trouble code 14 displayed **3**.
- Switch ignition OFF.
- Remove bridge wire.



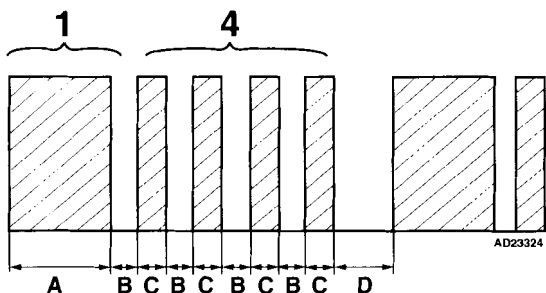


# HONDA

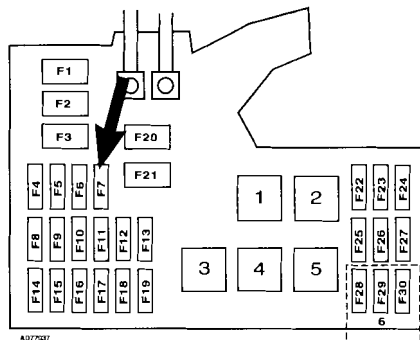
Model: Accord 1,8/2,0/2,2/3 • Accord Aerodeck/Coupe 2,0/2,2

## Transmission

3



4



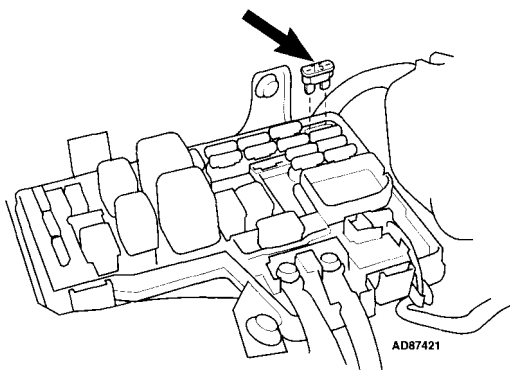
### Erasing

- Switch ignition OFF.
- Remove bridge wire.
- Remove BACK UP (RADIO) fuse (7,5A) from underbonnet fusebox for 10 seconds minimum: F18A3, F20Z1, F20Z2, F22Z2, H23A3 **4**, F20B3, F22B5 **5**.
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

**WARNING:** Disconnecting BACK UP fuse or battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in TCM fault memory.

5



### Trouble code identification

Flash type	Fault location	Probable cause
1	Torque converter clutch (TCC) lock-up solenoid A	Wiring, TCC lock-up solenoid, TCM
2	Torque converter clutch (TCC) lock-up solenoid B	Wiring, TCC lock-up solenoid, TCM
3	Throttle position (TP) sensor	Wiring, TP sensor, TCM
4	Vehicle speed sensor (VSS)	Wiring, VSS, TCM
5	Transmission range (TR) switch – short circuit	Wiring, TR switch, TCM
6	Transmission range (TR) switch – open circuit	Wiring open circuit, TR switch, TCM
7	Shift solenoid A	Wiring, solenoid, TCM
8	Shift solenoid B	Wiring, solenoid, TCM
9	Transmission intermediate shaft speed sensor	Wiring, transmission intermediate shaft speed sensor, TCM
10	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, TCM
11	Ignition coil	Wiring, ignition coil
14	Engine control module (ECM)/transmission control module (TCM) – communication	Wiring, TCM, ECM
15	Input shaft speed (ISS) sensor	Wiring short circuit/open circuit, ISS sensor



Model: Getz 1,1/1,3 • Getz 1,5/1,6 DOHC  
 Accent 1,3/1,5 • Accent 1,5/1,6 16V  
 Elantra 1,6/1,8/2,0 • Sonata 2,0/2,5/2,7  
 Matrix 1,6/1,8 • Santa Fe 2,0/2,4/2,7

Year: 1998-04

Engine code: G4EA, G4EB, G4ED, G4EH, G4EK, G4FK, G4GB,  
 G4GC, G4HD, G4JP, G4JS, G6BA, G6BV

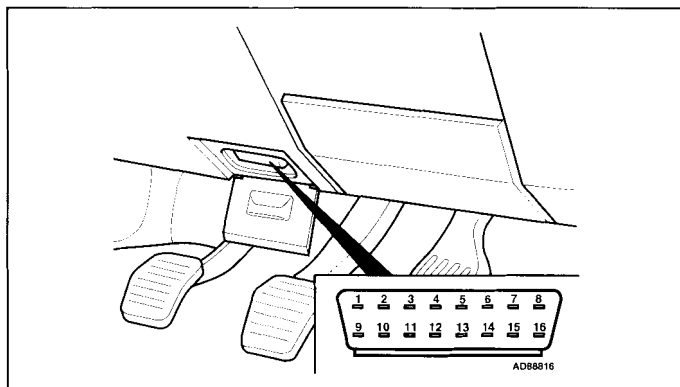
System: MFI (ECFI)

**HYUNDAI**

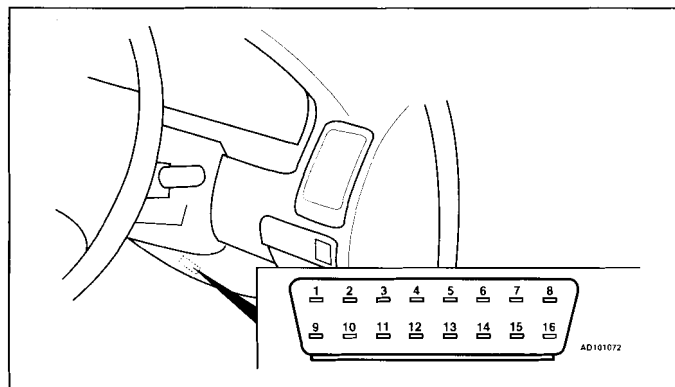


Engine management

## Data link connector (DLC) locations



Getz, Accent, Elantra, Matrix



Sonata, Santa Fe

## Self-diagnosis

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Engine control module (ECM) incorporates self-diagnosis function.

### Accessing

- The engine control module (ECM) fault memory can only be accessed using diagnostic equipment connected to the data link connector (DLC).

### Erasing

- Ensure ignition switched OFF.
- Disconnect battery earth lead for 15 seconds minimum.
- Reconnect battery earth lead.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

**NOTE:** *Disconnecting battery may erase memory from electronic units (e.g. radio, clock).*

- The engine control module (ECM) fault memory can also be erased using diagnostic equipment connected to the data link connector (DLC).

## Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	—
P1100	Manifold absolute pressure (MAP) sensor, EGR system – circuit malfunction	Wiring, MAP sensor
P1102	Manifold absolute pressure (MAP) sensor, EGR system mode 3	Wiring, hoses blocked/leaking, EGR valve, MAP sensor
P1103	Manifold absolute pressure (MAP) sensor, EGR system mode 2	Wiring, hoses blocked/leaking, EGR valve, MAP sensor
P1111	Heated oxygen sensor (HO2S) 1, bank 1 – no activity detected	Heating inoperative, poor connection, wiring, HO2S, ECM

**HYUNDAI**

Model: Getz 1,1/1,3 • Getz 1,5/1,6 DOHC • Accent 1,3/1,5  
 Accent 1,5/1,6 16V • Elantra 1,6/1,8/2,0 • Sonata 2,0/2,5/2,7  
 Matrix 1,6/1,8 • Santa Fe 2,0/2,4/2,7

**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1123	Long term fuel trim - additive – mixture too rich	HO2S, fuel pressure, fuel system, mechanical fault, ECM
P1124	Long term fuel trim - additive – mixture too lean	HO2S, fuel pressure, fuel system, mechanical fault, ECM
P1127	Long term fuel trim - multiplicative – system too rich	HO2S, fuel pressure, fuel system, mechanical fault, ECM
P1128	Long term fuel trim - multiplicative – system too lean	HO2S, fuel pressure, fuel system, mechanical fault, ECM
P1134	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Heating inoperative, HO2S
P1140	Engine load monitoring (MAF sensor/TP sensor) – implausible signals	Wiring, MAF sensor, TP sensor, mechanical fault
P1154	Heated oxygen sensor (HO2S) 1, bank 2 – slow response	Heating inoperative, HO2S
P1166	Heated oxygen sensor (HO2S) 1, bank 1 – control limit reached	Wiring open circuit, fuel pressure, exhaust system leak, EVAP system, HO2S
P1167	Heated oxygen sensor (HO2S) 1, bank 2 – control limit reached	Wiring open circuit, fuel pressure, exhaust system leak, EVAP system, HO2S
P1168	Heated oxygen sensor (HO2S) 2, bank 1, heater control – circuit malfunction	Wiring, HO2S
P1169	Heated oxygen sensor (HO2S) 2, bank 2, heater control – circuit malfunction	Wiring, HO2S
P1184	Heated oxygen sensor (HO2S) 1, bank 1 – no activity detected	Wiring open circuit, heating inoperative, HO2S
P1307	Rough road sensor – malfunction	Wiring, rough road sensor, ECM
P1308	Rough road sensor – voltage low	Wiring, rough road sensor, ECM
P1309	Rough road sensor – voltage high	Wiring, rough road sensor, ECM
P1372	Vehicle speed sensor (VSS) – range/performance problem	Wiring, wheel speed sensor, mechanical fault
P1400	Exhaust gas recirculation (EGR) system – monitor malfunction	Wiring, EGR solenoid, EGR valve, mechanical fault, ECM
P1401	Fuel tank leakage diagnostic module – system malfunction	Fuel tank leakage diagnostic module
P1402	Fuel tank leakage diagnostic module – motor malfunction	Fuel tank leakage diagnostic module motor
P1403	Fuel tank leakage diagnostic module – valve malfunction	Fuel tank leakage diagnostic module valve
P1404	Fuel tank leakage diagnostic module – heater malfunction	Fuel tank leakage diagnostic module
P1440	Evaporative emission (EVAP) system, EVAP vent valve – circuit malfunction	Wiring, EVAP canister purge valve, ECM
P1502	Wheel speed sensor – open circuit	Wiring, wheel speed sensor
P1505	Idle air control (IAC) valve opening coil – open circuit	Wiring, IAC valve
P1506	Idle air control (IAC) valve opening coil – short circuit	Wiring, IAC valve
P1507	Idle air control (IAC) valve closing coil – open circuit	Wiring, IAC valve
P1508	Idle air control (IAC) valve closing coil – short circuit	Wiring, IAC valve
P1510	Idle air control (IAC) valve – circuit malfunction – wiring open/short circuit	Wiring, IAC valve, mechanical fault
P1511	Idle air control (IAC) valve – circuit malfunction – wiring open/short circuit	Wiring, IAC valve, mechanical fault
P1513	Idle air control (IAC) valve opening coil – short circuit	Wiring, IAC valve, mechanical fault

Model: Getz 1,1/1,3 • Getz 1,5/1,6 DOHC • Accent 1,3/1,5  
 Accent 1,5/1,6 16V • Elantra 1,6/1,8/2,0 • Sonata 2,0/2,5/2,7  
 Matrix 1,6/1,8 • Santa Fe 2,0/2,4/2,7

**HYUNDAI**



Engine management

EOBD type	Fault location	Probable cause
P1515	Idle air control (IAC) valve – coil 1 – signal malfunction	Wiring, IAC valve
P1516	Idle air control (IAC) valve – coil 2 – signal malfunction	Wiring, IAC valve
P1520	Alternator – FR terminal malfunction	Wiring
P1521	Power steering pressure (PSP) switch – circuit malfunction	Wiring, PSP switch
P1529	Transmission control module (TCM) – communication	Wiring, TCM, ECM
P1552	Idle air control (IAC) valve closing coil – short circuit	Wiring, IAC valve, mechanical fault
P1553	Idle air control (IAC) valve closing coil – open circuit	Wiring, IAC valve, mechanical fault
P1586	AT coding – implausible signal	Wiring, mechanical fault
P1602	Transmission control module (TCM) – serial communication error	Wiring, TCM, ECM
P1605	G-force sensor – circuit malfunction	Wiring, G-force sensor, ECM
P1606	G-force sensor – implausible signal	Wiring, G-force sensor, ECM
P1611	MIL request signal – circuit malfunction/voltage low	Wiring, ECM
P1613	MIL request signal – circuit malfunction/voltage high	Wiring, ECM
P1614	MIL request signal – circuit malfunction/voltage high	Wiring, ECM
P1616	Engine control relay – circuit malfunction	Wiring, fuse, engine control relay
P1623	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, MIL
P1624	Engine coolant blower motor relay – low blower speed circuit malfunction – except Accent	Wiring, engine coolant blower motor relay
P1624	Transmission control module (TCM) – system malfunction – Accent	Wiring, trouble code(s) stored in other system(s)
P1625	Engine coolant blower motor relay – high blower speed circuit malfunction	Wiring, engine coolant blower motor relay
P1665	Ignition power stage A – circuit malfunction	Wiring, ignition control module
P1670	Ignition power stage B – circuit malfunction	Wiring, ignition control module
P1693	Transmission control module (TCM) MIL request circuit – circuit malfunction	Wiring, TCM, ECM
P1715	AT pulse generators – open circuit	Wiring, mechanical fault
P1750	AT – shift solenoids	Wiring, mechanical fault
P1765	Transmission control module (TCM) – torque reduction malfunction	Wiring, TCM, ECM

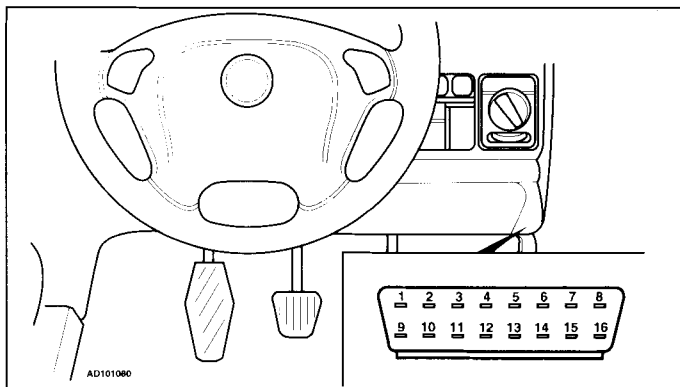


**ISUZU**

Model: Trooper 3,5  
Year: 1998-03  
Engine code: 6VE1  
System: MFI

## Engine management

### Data link connector (DLC) locations



### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Engine control module (ECM) incorporates self-diagnosis function.

#### Accessing

- The engine control module (ECM) fault memory can only be accessed using diagnostic equipment connected to the data link connector (DLC).

#### Erasing

- Ensure ignition switched OFF.
- Disconnect battery earth lead for 30 seconds minimum.
- Reconnect battery earth lead.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

**NOTE:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- The engine control module (ECM) fault memory can also be erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	—
P1106	Manifold absolute pressure (MAP) sensor – circuit malfunction/intermittent voltage high	Wiring, MAP sensor, mechanical fault, ECM
P1107	Manifold absolute pressure (MAP) sensor – circuit malfunction/intermittent voltage low	Wiring, MAP sensor, mechanical fault, ECM
P1111	Intake air temperature (IAT) sensor – circuit malfunction/intermittent voltage high	Wiring, IAT sensor, ECM
P1112	Intake air temperature (IAT) sensor – circuit malfunction/intermittent voltage low	Wiring, IAT sensor, ECM
P1114	Engine coolant temperature (ECT) sensor – circuit malfunction/intermittent voltage high	Wiring, ECT sensor, ECM
P1115	Engine coolant temperature (ECT) sensor – circuit malfunction/intermittent voltage low	Wiring, ECT sensor, ECM
P1120	Throttle motor position sensor 1 – circuit malfunction	Wiring open circuit/short circuit to earth/short circuit to positive, throttle control unit, ECM
P1121	Throttle position (TP) sensor – circuit malfunction/intermittent voltage high	Wiring, TP sensor, mechanical fault, ECM



EOBD type	Fault location	Probable cause
P1122	Throttle position (TP) sensor – circuit malfunction/intermittent voltage low	Wiring, TP sensor, mechanical fault, ECM
P1125	Throttle motor – fail safe mode	Wiring, TP sensor, throttle motor, mechanical fault, ECM
P1133	Heated oxygen sensor (HO2S) – RH front (6 cyl.) – insufficient switching	Wiring, HO2S, fuel system, fuel pressure, mechanical fault, ECM
P1133	Oxygen sensor (O2S) – front (4 cyl.) – insufficient switching	Wiring, O2S, fuel system, fuel pressure, mechanical fault, ECM
P1134	Heated oxygen sensor (HO2S) – RH front – slow response	Wiring, HO2S, fuel system, fuel pressure, mechanical fault, ECM
P1153	Heated oxygen sensor (HO2S) – LH front – insufficient switching	Wiring, HO2S, fuel system, fuel pressure, mechanical fault, ECM
P1154	Heated oxygen sensor (HO2S) – LH front – slow response	Wiring, HO2S, fuel system, fuel pressure, mechanical fault, ECM
P1167	Fuel trim, bank 1 – mixture too rich during deceleration	Injectors, fuel pump, fuel pressure, ECM
P1169	Fuel trim, bank 2 – mixture too rich during deceleration	Injectors, fuel pump, fuel pressure, ECM
P1171	Fuel trim – mixture too lean during acceleration	Wiring, O2S/HO2S, mechanical fault, fuel system, fuel pressure, ECM
P1220	Throttle motor position sensor 2 – circuit malfunction	Wiring open circuit/short circuit to earth/short circuit to positive, throttle control unit, ECM
P1221	Throttle motor position sensor 1/2 – signal variation	Wiring, throttle control unit, ECM
P1271	Accelerator pedal position (APP) sensor 1/2 – signal variation	Wiring, APP sensor, ECM
P1272	Accelerator pedal position (APP) sensor 2/3 – signal variation	Wiring, APP sensor, ECM
P1273	Accelerator pedal position (APP) sensor 1/3 – signal variation	Wiring, APP sensor, ECM
P1275	Accelerator pedal position (APP) sensor 1 – circuit malfunction	Wiring open circuit/short circuit to earth/short circuit to positive, APP sensor, ECM
P1280	Accelerator pedal position (APP) sensor 2 – circuit malfunction	Wiring open circuit/short circuit to earth/short circuit to positive, APP sensor, ECM
P1285	Accelerator pedal position (APP) sensor 3 – circuit malfunction	Wiring, APP sensor, ECM
P1290	Throttle motor – forced idle mode	Wiring, APP sensor, throttle motor, mechanical fault, ECM
P1295	Throttle motor – power management mode	Wiring, TP sensor, throttle motor, MAP sensor, MAF sensor, ECM
P1299	Throttle motor – forced engine shut down mode	Wiring, TP sensor, throttle motor, MAP sensor, MAF sensor, ECM
P1310	Ignition control module (ICM) – diagnosis	Wiring, ignition coil(s), ICM, ECM
P1311	Ignition control module (ICM) – ignition coil, secondary coil signal, circuit 1	Wiring, ignition coil(s), ICM, ECM
P1312	Ignition control module (ICM) – ignition coil, secondary coil signal, circuit 2	Wiring, ignition coil(s), ICM, ECM
P1326	Ignition control module (ICM) – combustion quality input signal	Wiring, ignition coil(s), ICM, ECM
P1336	Crankshaft position (CKP) sensor – signal variation	Wiring, CKP sensor, mechanical fault, ECM



**ISUZU**

Model: Trooper 3,5

**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1336	Crankshaft position (CKP) sensor – variation not learned	Learning procedure not performed
P1340	Ignition control module (ICM) – cylinder identification/synchronization	Wiring, ignition coil(s), ICM, ECM
P1345	CKP sensor/CMP sensor – signal malfunction	Wiring, CKP/CMP sensor, mechanical fault
P1351	Ignition control module (ICM) – signal voltage high	Wiring, ignition control module, ignition system, mechanical fault, ECM
P1361	Ignition control module (ICM) – signal not switching	Wiring, ignition control module, ignition system, mechanical fault, ECM
P1380	ECM to ABS control module communication – invalid signal	Wiring, mechanical fault
P1381	ECM to ABS control module communication – misfire detected	Wiring, mechanical fault
P1390	G-force sensor – intermittent voltage low	Wiring, G-force sensor, mechanical fault, ECM
P1391	G-force sensor – performance problem	Wiring, G-force sensor, mechanical fault, ECM
P1392	G-force sensor – voltage low	Wiring, G-force sensor, mechanical fault, ECM
P1393	G-force sensor – voltage high	Wiring, G-force sensor, mechanical fault, ECM
P1394	G-force sensor – intermittent voltage high	Wiring, G-force sensor, mechanical fault, ECM
P1404	Exhaust gas recirculation (EGR) solenoid – valve closed	Wiring, EGR valve, EGR solenoid, EGR valve position sensor, mechanical fault, ECM
P1405	Exhaust gas recirculation (EGR) valve – valve stuck open	Wiring open circuit/short circuit to positive, exhaust gas recirculation (EGR) valve position sensor, EGR solenoid
P1406	Exhaust gas recirculation (EGR) system – circuit malfunction	Wiring, EGR valve, EGR solenoid, EGR valve position sensor, mechanical fault, ECM
P1415	Secondary air injection (AIR) system, bank 1	Wiring, hoses blocked/leaking, AIR valve
P1416	Secondary air injection (AIR) system, bank 2	Wiring, hoses blocked/leaking, AIR valve
P1441	Evaporative emission (EVAP) system – leak detected	Wiring, EVAP valve, EVAP solenoid, hoses, mechanical fault
P1442	Evaporative emission (EVAP) canister purge switch – voltage high	Wiring, EVAP valve, EVAP solenoid, hoses, mechanical fault
P1508	Idle air control (IAC) system – low rpm	Wiring, IAC valve, mechanical fault, ECM
P1509	Idle air control (IAC) system – high rpm	Wiring, IAC valve, mechanical fault, ECM
P1514	Throttle position (TP) sensor/mass air flow (MAF) sensor – signal variation	Wiring, TP sensor, MAF sensor, ECM
P1515	Throttle valve command/actual valve throttle position – signal variation	Wiring, throttle valve sticking, throttle control unit, ECM
P1516	Throttle position motor – throttle position performance problem	Throttle valve tight/sticking, TP sensor, wiring, throttle control unit, ECM
P1520	Park/neutral position (PNP) switch – circuit malfunction	Wiring, PNP switch, mechanical fault
P1523	Throttle position motor – closed throttle position (CTP) performance problem	Throttle valve tight/sticking, TP sensor, wiring open circuit/short circuit to earth, throttle control unit, ECM
P1546	AC compressor clutch relay – circuit malfunction	Wiring open circuit/short circuit to earth/short circuit to positive, AC compressor clutch relay, ECM
P1571	Brake pedal position (BPP) switch – no operation	Wiring, BPP switch





<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1574	Brake pedal position (BPP) switch – circuit malfunction	Wiring, BPP switch
P1600	Serial communication – malfunction	ECM
P1601	Serial communication – malfunction	ECM
P1602	ECM to ABS control module communication – circuit malfunction	ECM
P1618	Engine control module (ECM) – internal fault	ECM
P1621	Engine control module (ECM) – internal memory fault	ECM
P1625	Engine control module (ECM) – unexpected reset	Interference from non standard electronics, erase trouble code and re-test
P1626	Immobilizer system – ECM to body control module (BCM) communication error	Wiring, ECM, body control module
P1627	Engine control module (ECM) – analogue/digital converter	Sensor supply wire open circuit/short circuit, ECM
P1631	Immobilizer system – password/code incorrect	Immobilizer control module, incorrect key, mechanical fault, ECM
P1632	Immobilizer system – fuelling disabled	Immobilizer control module, incorrect key, mechanical fault, ECM
P1635	Sensor supply voltage – circuit A malfunction	Wiring short circuit to positive/earth, earth wiring open circuit, ECM
P1636	Engine control module (ECM) – RAM stack	Interference from non standard electronics, erase trouble code and re-test
P1639	Sensor supply voltage – circuit B malfunction	Wiring short circuit to positive/earth, earth wiring open circuit, throttle position (TP) sensor, ECM
P1640	Engine control module (ECM), output driver 1 – supply voltage high	Wiring, instruments, EVAP canister purge valve, AC compressor relay
P1646	Sensor supply voltage – circuit C malfunction	Wiring short circuit to positive/earth, earth wiring open circuit, accelerator pedal position (APP) sensor, ECM
P1650	Engine control module (ECM) – quad driver/output driver	Wiring, evaporative emission (EVAP) canister purge valve, intake manifold air control solenoid, ECM
P1790	Engine control module (ECM) – AT ROM checksum error	ECM
P1792	AT – EEPROM checksum error	ECM
P1835	AT – kick-down switch	Wiring, kick-down switch, mechanical fault
P1860	AT – torque converter clutch (TCC) solenoid circuit	Wiring, TCC solenoid
P1870	AT – transmission component slipping	Mechanical fault
U1000	Class 2 communication ID not learned	ECM
U1026	4WD AT control module communication – no signal	Wiring, 4WD AT control module, ECM
U1041	ECM to ABS control module communication – no signal	Wiring, ABS control module, ECM
U1064	ECM to body control module (BCM) communication – no signal	Wiring, BCM, ECM





# JAGUAR

Model: XJ6 3,2/4,0 • Sovereign 3,2/4,0 • XJR 4,0  
XJ12 6,0

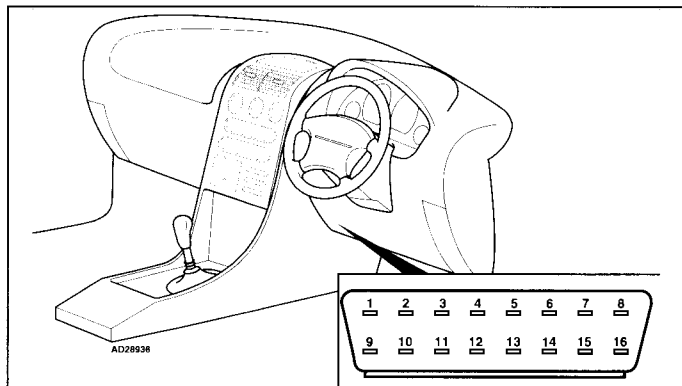
Year: 1994-97

Engine code: AJ16, V12

System: Nippon Denso

Engine management

## Data link connector (DLC) locations



## Self-diagnosis

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Engine control module (ECM) incorporates self-diagnosis function.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1000	Engine control module (ECM) – internal error	ECM
P1111	Engine control module (ECM) – internal error	ECM
P1106	Manifold absolute pressure (MAP) sensor – range/performance	Wiring, MAP sensor
P1107	Manifold absolute pressure (MAP) sensor – circuit low input	Wiring short to earth, MAP sensor, ECM
P1108	Manifold absolute pressure (MAP) sensor – circuit high input	Wiring short to positive, MAP sensor, ECM
P1135	Crankshaft position (CKP) sensor	Wiring, CKP sensor
P1136	Crankshaft position (CKP) sensor	Wiring, CKP sensor



EOBD type	Fault location	Probable cause
P1137	Heated oxygen sensor (HO2S) 2 – cylinders 1,2,3 – lean mixture	Wiring, HO2S
P1138	Heated oxygen sensor (HO2S) 2 – cylinders 1,2,3 – rich mixture	Wiring, HO2S
P1157	Heated oxygen sensor (HO2S) 2 – cylinders 4,5,6 – lean mixture	Wiring, HO2S
P1158	Heated oxygen sensor (HO2S) 2 – cylinders 4,5,6 – rich mixture	Wiring, HO2S
P1171	Weak mixture – cylinders 1,2,3,4,5,6	Wiring, fuel level, fuel pump, fuel pump relay, injector(s)
P1172	Rich mixture – cylinders 1,2,3,4,5,6	Fuel line blocked, injector(s), trouble code(s) stored in other system(s)
P1176	Weak mixture – long term fuel trim	Wiring, fuel pump, fuel filter blocked, injector(s), trouble code(s) stored in other system(s)
P1177	Rich mixture – long term fuel trim	Fuel pressure, fuel line blocked, injector(s), trouble code(s) stored in other system(s)
P1178	Weak mixture – long term fuel trim	Air leak, trouble code(s) stored in other system(s)
P1179	Rich mixture – long term fuel trim	Exhaust leak, trouble code(s) stored in other system(s)
P1185	Oxygen sensor heater 1 – cylinders 1,2,3,4,5,6	Wiring, HO2S
P1186	Oxygen sensor heater 1 – cylinders 1,2,3,4,5,6	Wiring, HO2S
P1187	Oxygen sensor heater 1 – cylinders 1,2,3,4,5,6 – circuit malfunction	Wiring, HO2S
P1188	Oxygen sensor heater 1 – cylinders 1,2,3,4,5,6 – heater resistance	Wiring, HO2S
P1189	Oxygen sensor heater 1 – cylinders 1,2,3,4,5,6 – heater resistance low	Wiring, HO2S
P1190	Oxygen sensor heater 1 – cylinders 1,2,3,4,5,6 – heater resistance low	Wiring, HO2S
P1191	Oxygen sensor heater 2 – cylinders 1,2,3,4,5,6	Wiring, HO2S
P1192	Oxygen sensor heater 2 – cylinders 1,2,3,4,5,6	Wiring, HO2S
P1193	Oxygen sensor heater 2 – cylinders 1,2,3,4,5,6 – circuit malfunction	Wiring, HO2S
P1194	Oxygen sensor heater 2 – cylinders 1,2,3,4,5,6 – heater resistance	Wiring, HO2S
P1195	Oxygen sensor heater 2 – cylinders 1,2,3,4,5,6 – heater resistance low	Wiring, HO2S
P1196	Oxygen sensor heater 2 – cylinders 1,2,3,4,5,6 – heater resistance low	Wiring, HO2S
P1198	Fuel level sensor	Wiring, fuel level sensor
P1199	Fuel level sensor	Wiring, fuel level sensor
P1201	Injector – cylinder 1 – short circuit/open circuit	Wiring, injector
P1202	Injector – cylinder 2 – short circuit/open circuit	Wiring, injector



**JAGUAR**

Model: XJ6 3,2/4,0 • Sovereign 3,2/4,0 • XJR 4,0 • XJ12 6,0

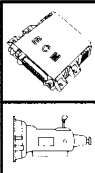
**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1203	Injector – cylinder 3 – short circuit/open circuit	Wiring, injector
P1204	Injector – cylinder 4 – short circuit/open circuit	Wiring, injector
P1205	Injector – cylinder 5 – short circuit/open circuit	Wiring, injector
P1206	Injector – cylinder 6 – short circuit/open circuit	Wiring, injector
P1240	Sensor power supply – malfunction	Wiring, MAP sensor, TP sensor
P1241	Sensor power supply – low input	Wiring, MAP sensor, TP sensor
P1242	Sensor power supply – high input	Wiring, MAP sensor, TP sensor
P1244	Barometric pressure (BARO) sensor, incorporated in ECM – range/performance	Wiring, ECM
P1245	No cranking signal – signal too low	Wiring, CKP sensor
P1246	No cranking signal – signal too high	Wiring, CKP sensor
P1313	Misfire/catalyst damage – bank 1	Engine mechanical fault, wiring, ignition/fuel system, injector(s), MAP sensor/TP sensor/ECT/IAT sensor, EVAP system, ECM
P1314	Misfire/catalyst damage – bank 2	Engine mechanical fault, wiring, ignition/fuel system, injector(s), MAP sensor/TP sensor/ECT/IAT sensor, EVAP system, ECM
P1315	Persistent misfire	Trouble code(s) stored in other system(s) (P0301-P0306)
P1316	Misfire	Wiring, trouble code(s) stored in other system(s), ignition/fuel system, MAP sensor/TP sensor/ECT/IAT sensor, injector(s), ECM
P1335	Crankshaft position (CKP) sensor – circuit malfunction	Wiring, CKP sensor, ECM
P1336	Crankshaft position (CKP) sensor – range/performance	Insecure sensor/rotor, air gap, wiring, CKP sensor
P1361	Ignition coil, cylinder 1 – no activation	Wiring, ignition coil, engine control relay, ECM
P1362	Ignition coil, cylinder 2 – no activation	Wiring, ignition coil, engine control relay, ECM
P1363	Ignition coil, cylinder 3 – no activation	Wiring, ignition coil, engine control relay, ECM
P1364	Ignition coil, cylinder 4 – no activation	Wiring, ignition coil, engine control relay, ECM
P1365	Ignition coil, cylinder 5 – no activation	Wiring, ignition coil, engine control relay, ECM
P1366	Ignition coil, cylinder 6 – no activation	Wiring, ignition coil, engine control relay, ECM
P1367	Ignition amplifier – ECM signal – bank 1	Wiring, ignition coil relay, ignition amplifier, ECM
P1368	Ignition amplifier – ECM signal – bank 2	Wiring, ignition coil relay, ignition amplifier, ECM
P1371	Ignition coil, cylinder 1 – early activation	Wiring, ignition coil, engine control relay, ECM
P1372	Ignition coil, cylinder 2 – early activation	Wiring, ignition coil, engine control relay, ECM
P1373	Ignition coil, cylinder 3 – early activation	Wiring, ignition coil, engine control relay, ECM
P1374	Ignition coil, cylinder 4 – early activation	Wiring, ignition coil, engine control relay, ECM
P1375	Ignition coil, cylinder 5 – early activation	Wiring, ignition coil, engine control relay, ECM
P1376	Ignition coil, cylinder 6 – early activation	Wiring, ignition coil, engine control relay, ECM
P1400	Exhaust gas recirculation (EGR) solenoid – valve position control	Wiring, EGR valve position sensor, EGR solenoid
P1401	Exhaust gas recirculation (EGR) solenoid – valve position control	Wiring, EGR valve position sensor, EGR solenoid
P1408	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid, EGR temperature sensor, EGR solenoid



<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1409	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid, EGR temperature sensor, EGR solenoid
P1440	Evaporative emission (EVAP) canister purge valve – open	Wiring, EVAP canister purge valve, ECM
P1441	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, hose connection(s)
P1443	Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring, EVAP canister purge valve, ECM
P1448	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, hose connection(s)
P1506	Idle air control (IAC) valve – rpm lower than expected	Wiring, intake blocked, MAP sensor, IAC valve, fuel pressure, ECM
P1507	Idle air control (IAC) valve – rpm higher than expected	Wiring, intake air leak, throttle valve sticking, MAP sensor, ECM
P1508	Idle air control (IAC) valve – circuit malfunction	Wiring open circuit, IAC valve, ECM
P1509	Idle air control (IAC) valve – circuit malfunction	Wiring short circuit, IAC valve, ECM
P1512	Closed throttle position (CTP) switch – low input	Wiring, CTP switch, ECM
P1513	Closed throttle position (CTP) switch – high input	Wiring, CTP switch, ECM
P1514	Park/neutral position (PNP) switch – high load neutral/drive	Wiring, PNP switch
P1516	Park/neutral position (PNP) switch – gear change neutral/drive	Wiring, PNP switch
P1517	Park/neutral position (PNP) switch – cranking neutral/drive	Wiring, PNP switch
P1607	Engine control module (ECM) – MIL circuit	Wiring, MIL, ECM
P1608	Engine control module (ECM)	ECM
P1621	Engine control module (ECM)	ECM
P1622	Engine control module (ECM)	ECM
P1641	Fuel pump relay 1 – malfunction	Wiring, fuel pump relay
P1646	Fuel pump relay 2 – malfunction	Wiring, fuel pump relay
P1775	Engine control module (ECM) – TCM signal	Wiring, ECM
P1776	Engine control module (ECM) – TCM retard signal	Wiring, ECM
P1777	Engine control module (ECM) – TCM retard signal	Wiring, ECM





# LAND ROVER

Freelander 1,8 • Freelander 2,0D Turbo • Freelander 2,0 TD4 • Freelander 2,5  
Discovery 2,5 TD5 • Discovery 4,0 • Range Rover 3,0 TD6 • Range Rover 4,0 • Range Rover 4,4  
Range Rover 4,6

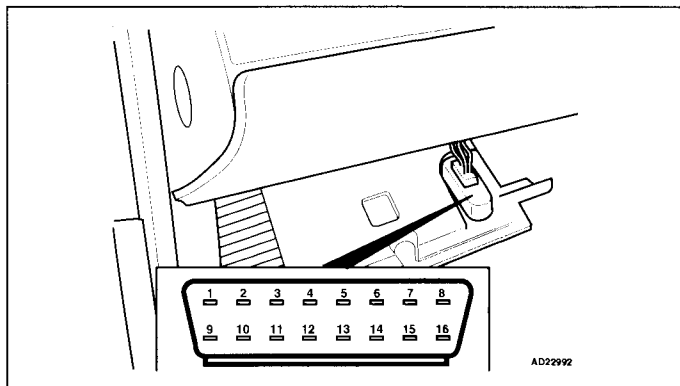
Year: 1994-04

Engine code: 10P, 15P, 18K16, 20T, 36D, 42D, 44 8S 2, 46D, 56D, 58D, 60D, 94D, K18, KV6, TD4, TD6

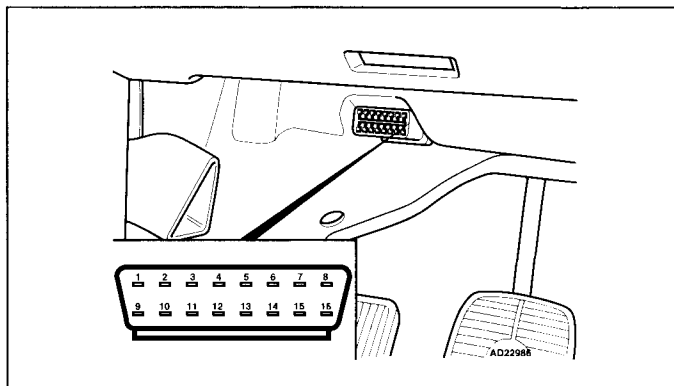
System: Bosch CP1/3 • Bosch Motronic M5.2.1 • Bosch Motronic ME7.2 • Bosch EDC/MSA 11 • Lucas  
MEMS1.9/3 • Sagem/Lucas GEMS 8.2 • Siemens EMS 2000

Engine management/transmission

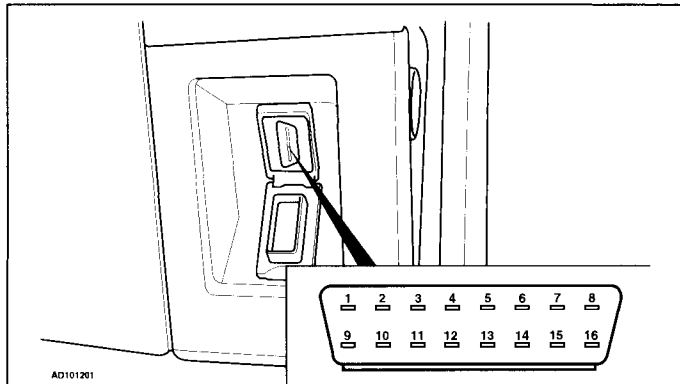
## Data link connector (DLC) locations



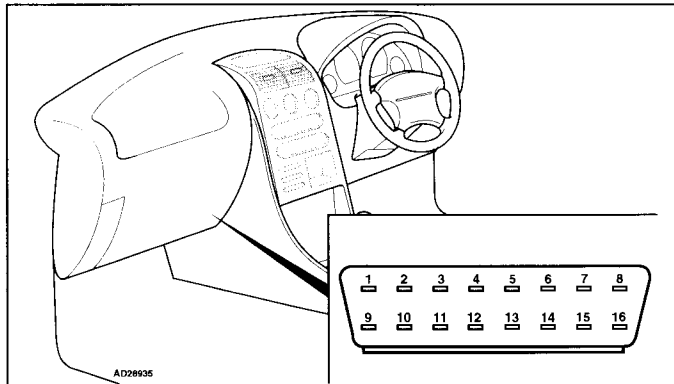
Range Rover →2001 – fascia, passenger's side



Discovery – under fascia, driver's side



Range Rover 2001 → – fascia, driver's side



Freelander – under fascia, passenger's side

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

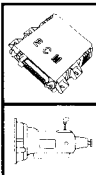
### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).



### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1000	Engine control module (ECM) memory erased – no codes stored	Memory erased, ECM
P1100	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – circuit malfunction	Wiring, supply voltage, earth connection, MAF sensor, ECM
P1101	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – range/performance problem	Wiring, supply voltage, earth connection, intake leak, MAF sensor, ECM
P1102	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – voltage low	Wiring short to earth, supply voltage, earth connection, MAF sensor, ECM
P1112	Intake air temperature (IAT) sensor – circuit intermittent	Wiring, poor connection, IAT sensor, ECM
P1116	Engine coolant temperature (ECT) sensor – range/performance problem	Wiring, ECT sensor, ECM
P1117 <sup>1</sup>	Radiator outlet engine coolant temperature (ECT) – low input	Wiring, ECT sensor, ECM
P1117 <sup>2</sup>	Engine coolant temperature (ECT) sensor – circuit intermittent	Wiring, ECT sensor, ECM
P1118	Radiator outlet engine coolant temperature (ECT) – high input	Wiring, ECT sensor, ECM
P1120	Throttle position (TP) sensor – range/performance problem	Wiring, supply voltage, TP sensor, ECM
P1121	Throttle position (TP) sensor – range/performance problem	Wiring, supply voltage, TP sensor, ECM
P1122	Throttle position (TP) sensor – circuit malfunction	Wiring, supply voltage, TP sensor, ECM
P1123	Throttle position (TP) sensor – voltage low	Wiring short to earth, supply voltage, earth connection, TP sensor, ECM
P1124	Throttle position (TP) sensor – voltage high	Wiring open circuit/short to positive, TP sensor, ECM
P1125	Throttle position (TP) sensor – circuit intermittent	Wiring, TP sensor, ECM
P1128	Heated oxygen sensor (HO2S) upstream – transposed	Wiring transposed
P1129	Heated oxygen sensors (HO2S) 1 – sensors transposed	Wiring
P1130	Heated oxygen sensor (HO2S) upstream, bank 1 – range/performance	Wiring, heater supply voltage, earth connection, HO2S, ECM
P1131	Heated oxygen sensor (HO2S) upstream, bank 1 – lean	Intake leak, fuel pressure low, injector(s) blocked, HO2S, ECM
P1132	Heated oxygen sensor (HO2S) upstream, bank 1 – rich	Intake blockage, fuel pressure high, injector(s) leaking, HO2S, ECM
P1150	Heated oxygen sensor (HO2S) upstream, bank 2 – range/performance	Wiring, heater supply voltage, earth connection, HO2S, ECM
P1151	Heated oxygen sensor (HO2S) upstream, bank 2 – lean	Intake leak, fuel pressure low, injector(s) blocked, HO2S, ECM
P1152	Heated oxygen sensor (HO2S) upstream, bank 2 – rich	Intake blockage, fuel pressure high, injector(s) leaking, HO2S, ECM
P1170	Downstream fuel trim (FT), bank 1 – malfunction	Wiring, HO2S

**LAND ROVER**

Model:

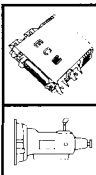
Freelander 1,8 • Freelander 2,0D Turbo • Freelander 2,0 TD4 • Freelander 2,5  
Discovery 2,5 TD5 • Discovery 4,0 • Range Rover 3,0 TD6 • Range Rover 4,0/4,4/4,6**Engine management/transmission**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1171	System too lean, bank 1	Intake/fuel system, injectors, HO2S, MAF/VAF sensor, ECT sensor
P1172	System too rich, bank 1 & 2	Intake/fuel system, injectors, HO2S, MAF/VAF sensor, ECT sensor
P1173	Downstream fuel trim (FT), bank 2 – malfunction	Intake/fuel system, injectors, HO2S, MAF/VAF sensor, ECT sensor
P1174	System too lean, bank 2	Intake/fuel system, injectors, HO2S, MAF/VAF sensor, ECT sensor
P1188	Fuel trim (FT), bank 1 – adaptation	Intake/fuel system, injectors, HO2S, MAF/VAF sensor, ECT sensor
P1189	Fuel trim (FT), bank 2 – adaptation	Intake/fuel system, injectors, HO2S, MAF/VAF sensor, ECT sensor
P1230	Fuel pump relay – open circuit	Wiring, relay
P1231 <b>1</b>	Fuel pump relay – short circuit to positive	Wiring, relay
P1231 <b>2</b>	Fuel pump – high speed	Wiring, supply voltage, earth connection, fuel pump, ECM
P1232 <b>1</b>	Fuel pump relay – short circuit to earth	Wiring, relay
P1232 <b>2</b>	Fuel pump – circuit malfunction	Wiring, supply voltage, earth connection, fuel pump, ECM
P1235	Fuel pump – range/performance problem	Wiring, fuel pump, ECM
P1244	Alternator, load input – voltage low	Wiring short to earth, alternator, ECM
P1245	Alternator, load input – voltage high	Wiring short to earth, battery was disconnected, alternator, ECM
P1246	Alternator, load input – circuit malfunction	Wiring, earth connection, alternator, ECM
P1260	Engine disabled by PATS	Incorrect/damaged key, wiring, immobilizer defective, ECM
P1270	Engine speed (RPM) – range/performance problem	Engine over revved in neutral, wheel slippage
P1287	Engine fuel demand – range/performance problem	Intake/exhaust leak, intake blocked, MAF/VAF sensor, fuel pressure/pump, injector(s), EGR system, EVAP canister purge valve, HO2S
P1288	Cylinder head temperature – range/performance problem	Wiring, cooling system fault, ECM
P1289	Cylinder head temperature – voltage high	Wiring, cooling system fault, ECM
P1290	Cylinder head temperature – voltage low	Wiring, cooling system fault, ECM
P1299	Cylinder head temperature – protection active	Wiring, cooling system fault, ECM
P1300	Random/multiple cylinder(s) – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P1301	Cylinder 1 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P1302	Cylinder 2 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P1303	Cylinder 3 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P1304	Cylinder 4 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P1305	Cylinder 5 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P1306	Cylinder 6 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM





EOBD type	Fault location	Probable cause
P1307	Cylinder 7 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P1308	Cylinder 8 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT/MAF sensor, ECM
P1319	Misfire detected with low fuel level	Low fuel level
P1351	Ignition diagnostic monitor – circuit malfunction	Wiring, ignition system, ECM
P1352	Ignition coil A, primary – circuit malfunction	Wiring, ignition coil, ECM
P1353	Ignition coil B, primary – circuit malfunction	Wiring, ignition coil, ECM
P1356	Ignition pickup signal – circuit malfunction	Wiring, ignition system, ECM
P1357	Ignition diagnostic monitor	Wiring, ignition system, ECM
P1358	Ignition diagnostic monitor – range/performance problem	Wiring, ignition system, ECM
P1359	Spark advance signal – circuit malfunction	Wiring, ignition system, ECM
P1360	Ignition coil A, secondary – circuit malfunction	Wiring, ignition coil, ECM
P1361	Ignition coil B, secondary – circuit malfunction	Wiring, ignition coil, ECM
P1362	Ignition coil C, secondary – circuit malfunction	Wiring, ignition coil, ECM
P1364	Ignition coil, primary – circuit malfunction	Wiring, ignition coil, ECM
P1365	Ignition coil, secondary – circuit malfunction	Wiring, ignition coil, ECM
P1380	Camshaft position (CMP) actuator – circuit malfunction	Wiring, CMP actuator, ECM
P1381	Camshaft position (CMP) actuator – over advanced	Valve timing, engine mechanical fault, CMP actuator
P1383	Camshaft position (CMP) actuator – over retarded	Valve timing, engine mechanical fault, CMP actuator
P1400	Exhaust gas pressure sensor – voltage low	Wiring short to earth, exhaust gas pressure sensor, ECM
P1401	Exhaust gas pressure sensor – voltage high	Wiring short to positive, exhaust gas pressure sensor, ECM
P1402	Exhaust gas recirculation (EGR) system	Wiring short to earth, EGR valve, ECM
P1403	Pressure transducer – hoses transposed	Hose blocked/missing/transposed, mechanical fault, pressure transducer
P1404	Pressure transducer – orifice restricted	Hose leak/blockage, mechanical fault, pressure transducer
P1407	ECM detected with no EGR flow	Hose leak/blockage, wiring, EGR valve, EGR solenoid, ECM
P1408	Exhaust gas recirculation (EGR) system – flow malfunction	Hose leak/blockage, wiring, EGR valve, EGR solenoid, ECM
P1409	Electronic vacuum regulator	Wiring, EGR valve, EGR solenoid, ECM
P1412	Secondary air injection (AIR) system, bank 1 – malfunction	Wiring, control valve, air pump, ECM
P1413	Secondary air injection (AIR) system, bank 1 – control valve open	Wiring, control valve, ECM
P1414	Secondary air injection (AIR) system, bank 1 – low flow	Wiring, control valve, air pump, ECM
P1415	Secondary air injection (AIR) system, bank 2 – malfunction	Wiring, control valve, air pump, ECM

**LAND ROVER**Model: Freelander 1,8 • Freelander 2,0D Turbo • Freelander 2,0 TD4 • Freelander 2,5  
Discovery 2,5 TD5 • Discovery 4,0 • Range Rover 3,0 TD6 • Range Rover 4,0/4,4/4,6**Engine management/transmission**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1416	Secondary air injection (AIR) system, bank 2 – control valve open	Wiring, control valve, ECM
P1417	Secondary air injection (AIR) system, bank 2 – low flow	Wiring, control valve, air pump, ECM
P1442	Evaporative emission (EVAP) system – leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
P1443	Evaporative emission (EVAP) system – circuit malfunction	Wiring, EVAP canister purge valve, ECM
P1450	Evaporative emission (EVAP) pressure pump – circuit plausibility	Wiring, pressure pump, ECM
P1451	Evaporative emission (EVAP) pressure pump – circuit high	Wiring, pressure pump, ECM
P1452	Evaporative emission (EVAP) pressure pump – low current	Wiring, pressure pump, ECM
P1453	Evaporative emission (EVAP) pressure pump – high current	Wiring, pressure pump, ECM
P1461	AC refrigerant pressure sensor – low input	AC refrigerant pressure too low (incorrectly charged), wiring, AC refrigerant pressure sensor, ECM
P1462	AC refrigerant pressure sensor – high input	AC refrigerant pressure too high (cooling fault/incorrectly charged), wiring, AC refrigerant pressure sensor, ECM
P1463	AC refrigerant pressure sensor	Wiring, AC refrigerant pressure sensor, ECM
P1465	Air conditioning – relay	Wiring, AC relay
P1469	Air conditioning – low cycling period	Wiring, AC system
P1500	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
P1504	Idle air control (IAC)	Wiring, IAC valve, ECM
P1505	Idle air control (IAC)	Wiring, IAC valve, ECM
P1506	Idle air control (IAC) – value high	Wiring short to positive, IAC valve, ECM
P1507	Idle air control (IAC) – value low	Wiring short to earth, IAC valve, ECM
P1509	Idle air control (IAC) valve opening coil – malfunction	Wiring, IAC valve
P1510	Idle air control (IAC) valve opening coil – circuit malfunction	Wiring, IAC valve
P1512	Intake manifold air control bank 1 – stuck closed	Wiring, intake manifold air control, mechanical fault
P1513 	Idle air control (IAC) valve opening coil – circuit low	Wiring short circuit to earth, IAC valve
P1513 	Intake manifold air control bank 2 – stuck closed	Wiring, intake manifold air control, mechanical fault
P1514	Idle air control (IAC) valve opening coil – circuit high	Wiring short circuit to positive, IAC valve
P1516	Intake manifold air control	Wiring, intake manifold air control, mechanical fault
P1518	Intake manifold air control – stuck open	Wiring, intake manifold air control, mechanical fault
P1519	Intake manifold air control – stuck closed	Wiring, intake manifold air control, mechanical fault
P1520	Intake manifold air control – circuit malfunction	Wiring, intake manifold air control
P1535	AC compressor request – malfunction	Wiring, AC master switch, AC control module



EOBD type	Fault location	Probable cause
P1536	AC compressor request – compressor relay open circuit	Wiring, compressor relay
P1537 <b>1</b>	AC compressor request – compressor relay short circuit to earth	Wiring, compressor relay
P1537 <b>2</b>	Intake manifold air control bank 1 – stuck open	Wiring, intake manifold air control, mechanical fault
P1538 <b>1</b>	AC compressor request – compressor relay short circuit to positive	Wiring, compressor relay
P1538 <b>2</b>	Intake manifold air control bank 2 – stuck open	Wiring, intake manifold air control, mechanical fault
P1550 <b>1</b>	Idle air control (IAC) valve closing coil – malfunction	Wiring, IAC valve
P1550 <b>2</b>	Power steering pressure (PSP) switch	Wiring, PAS system, PSP switch, ECM
P1551	Idle air control (IAC) valve closing coil – circuit malfunction	Wiring, IAC valve
P1552	Idle air control (IAC) valve closing coil – circuit low	Wiring open circuit/short circuit to earth, IAC valve
P1553	Idle air control (IAC) valve closing coil – circuit high	Wiring open circuit/short circuit to positive, IAC valve,
P1590	Antilock brake system (ABS) rough road signal – error message from ABS control unit	Wiring, ABS system
P1591	Antilock brake system (ABS) rough road signal – short circuit to earth/open circuit	Wiring, ABS system
P1592	Antilock brake system (ABS) rough road signal – short circuit to positive	Wiring, ABS system
P1605	Power interruption in KAM	Wiring, battery terminal corrosion, loose battery connection, ECM
P1641	Fuel pump – failure	Fuel pump, fuel pipe blockage, mechanical fault
P1642	Fuel pump – voltage high	Wiring short to positive, relay, fuel pump
P1643	Fuel pump – voltage low	Wiring short to earth, relay, fuel pump
P1644	Fuel pump – speed control	–
P1645	Fuel pump	Fuel pump, fuel pressure regulator, fuel pipe blockage, mechanical fault
P1650	Power steering pressure (PSP) switch	Wiring, PSP switch, ECM
P1651	Power steering pressure (PSP) switch – circuit malfunction	Wiring, PSP switch, ECM
P1663	Throttle angle/torque signal – ABS/HDC wiring open circuit	Wiring, ABS system, HDC system
P1664	Throttle angle/torque signal – ABS/HDC wiring short to earth	Wiring, ABS system, HDC system
P1665	Throttle angle/torque signal – ABS/HDC wiring short to positive	Wiring, ABS system, HDC system
P1666	Immobilizer signal – CAN data bus	Wiring, immobilizer control module
P1667	Immobilizer signal – CAN data bus	Wiring short circuit to earth
P1668	Immobilizer signal – CAN data bus	Wiring open circuit
P1669	Engine control module (ECM) cooling fan – circuit malfunction	Wiring, cooling fan relay, cooling fan motor



**LAND ROVER**Model: Freelander 1,8 • Freelander 2,0D Turbo • Freelander 2,0 TD4 • Freelander 2,5  
Discovery 2,5 TD5 • Discovery 4,0 • Range Rover 3,0 TD6 • Range Rover 4,0/4,4/4,6**Engine management/transmission**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1670	Engine control module (ECM) cooling fan – circuit low	Wiring short circuit to earth, cooling fan motor
P1671	Engine control module (ECM) cooling fan – circuit high	Wiring open circuit, cooling fan motor
P1672	Immobilizer signal – incorrect code	Incorrect key, immobilizer control module
P1673	Immobilizer signal	ECM not configured
P1674	Immobilizer signal – no valid code received	Incorrect key, wiring, immobilizer control module
P1675	Condenser fan – circuit malfunction	Wiring open/short circuit, condenser fan relay
P1700	Transfer box – low range signal implausible	Wiring, transmission mode selector switch, transfer box
P1701 <b>1</b>	Transfer box – fault signal	Wiring, transfer box
P1701 <b>2</b>	Reverse engagement error	Wiring, digital transmission selector/transmission range (TR) switch/PNP switch, shift solenoids, transmission mechanical fault, ECM/TCM
P1702	Transfer box signal line – communication error	Wiring, ECM
P1703 <b>1</b>	Transfer box link – signal line	Wiring open circuit/short circuit to positive
P1703 <b>2</b>	Brake pedal position (BPP) switch – range/performance problem	Wiring, BPP switch, ECM
P1704	Digital transmission selector	Wiring, digital transmission selector, ECM/TCM
P1705	High vehicle speed observed in park	Wiring, digital transmission selector/transmission range (TR) switch/PNP switch, VSS, ECM/TCM
P1708	Transfer box link – signal line	Wiring short circuit to earth
P1711	Transmission fluid temperature – range/performance problem	Wiring, TFT sensor, ECM/TCM
P1713	Transmission fluid temperature – value low	Wiring short to earth, TFT sensor, ECM/TCM
P1714	Shift solenoid (SS) 1 – defective	Wiring, shift solenoid, ECM/TCM
P1715	Shift solenoid (SS) 2 – defective	Wiring, shift solenoid, ECM/TCM
P1716	Shift solenoid (SS) 3 – defective	Wiring, shift solenoid, ECM/TCM
P1717	Coast clutch solenoid – defective	Wiring, coast clutch solenoid, ECM/TCM
P1718	Transmission fluid temperature – value high	Wiring short to positive, TFT sensor, ECM/TCM
P1728	Transmission slip fault	Torque converter clutch (TCC)
P1729	Transmission mode selection switch 4x4L – circuit malfunction	Wiring, transmission mode selection switch, ECM/TCM
P1740	Torque converter clutch (TCC)	Wiring, TCC solenoid, ECM/TCM
P1741	Torque converter clutch (TCC)	Wiring, TCC solenoid, ECM/TCM
P1742	Torque converter clutch (TCC)	Wiring, TCC solenoid, ECM/TCM
P1744	Torque converter clutch (TCC)	Wiring, TCC solenoid, ECM/TCM
P1745	Transmission fluid pressure (TFP) solenoid	Wiring, TFP solenoid, ECM/TCM
P1746	Transmission fluid pressure (TFP) solenoid – solenoid open	Wiring, TFP solenoid, ECM/TCM
P1747	Transmission fluid pressure (TFP) solenoid – solenoid closed	Wiring, TFP solenoid, ECM/TCM
P1749	Transmission fluid pressure (TFP) solenoid – low pressure	Wiring, TFP solenoid, ECM/TCM



EOBD type	Fault location	Probable cause
P1750	Transmission fluid pressure (TFP), REV – maximum control limit reached	Wiring, TFP solenoid, transmission, ECM/TCM
P1751	Shift solenoid (SS) 1 – defective	Wiring, shift solenoid, ECM/TCM
P1752	Transmission fluid pressure (TFP), 1st gear – maximum control limit reached	Wiring, TFP solenoid, transmission, ECM/TCM
P1753	Transmission fluid pressure (TFP), 2nd gear – maximum control limit reached	Wiring, TFP solenoid, transmission, ECM/TCM
P1754	Coast clutch solenoid – circuit malfunction	Wiring, coast clutch solenoid, ECM/TCM
P1755	Transmission fluid pressure (TFP), 3rd gear – maximum control limit reached	Wiring, TFP solenoid, transmission, ECM/TCM
P1756	Shift solenoid (SS) 2 – defective	Wiring, shift solenoid, ECM/TCM
P1757	Transmission fluid pressure (TFP), 4th gear – maximum control limit reached	Wiring, TFP solenoid, transmission, ECM/TCM
P1758	Transmission fluid pressure (TFP), forward stall – maximum control limit reached	Wiring, TFP solenoid, transmission, ECM/TCM
P1759	Transmission fluid pressure (TFP), reverse stall – maximum control limit reached	Wiring, TFP solenoid, transmission, ECM/TCM
P1760	Transmission fluid pressure (TFP) solenoid – short circuit	Wiring, TFP solenoid, ECM/TCM
P1761	Shift solenoid (SS) 3 – defective	Wiring, shift solenoid, ECM/TCM
P1765	INJ TIM	–
P1766	Coast clutch solenoid – defective	Wiring, coast clutch solenoid, ECM/TCM
P1767	Torque converter clutch (TCC)	Wiring, TCC, TCM
P1768	Economy/sport switch, winter weather	Wiring, economy/sport switch, TCM
P1769	Torque modulation circuit	–
P1776	Transmission control system – torque interface malfunction	Wiring, transmission control module ECM/TCM
P1779	Transmission warning lamp	Wiring, poor connection, transmission warning lamp, ECM/TCM
P1780	Transmission mode selection switch overdrive cancel	Wiring, digital transmission selector/transmission mode selection switch/PNP switch, ECM/TCM
P1781	Transmission mode selection switch 4x4 – circuit out of self-test range	Wiring, operator error, digital transmission selector/transmission mode selection switch/PNP switch, ECM/TCM
P1783	Transmission over temperature	Transmission fluid level low, transmission mechanical fault, TFT sensor, TCM
P1784	Transmission – mechanical fault	Transmission mechanical fault
P1785	Transmission – mechanical fault	Transmission mechanical fault
P1788	Torque converter clutch (TCC) – open circuit	Wiring, TCC solenoid, ECM/TCM
P1789	Torque converter clutch (TCC) – closed circuit	Wiring, TCC solenoid, ECM/TCM
P1792	Barometric pressure (BARO) sensor	Wiring, BARO sensor, ECM
P1795	Battery voltage	Wiring, poor connection, battery, alternator

1 Except Sagem/Lucas GEMS 8.2.

2 Sagem/Lucas GEMS 8.2.



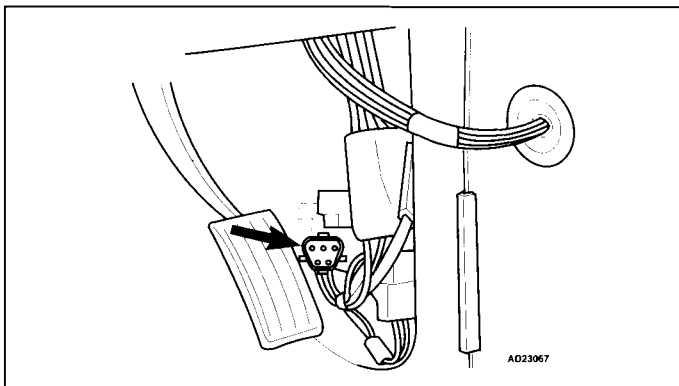


# LAND ROVER

Model: Discovery 3,5 • Discovery 3,9  
Range Rover 3,9  
Year: 1989-98  
Engine code: 22D, 35D, 36D  
System: Lucas 14 CUX

## Engine management

### Data link connector (DLC) locations



RH kick panel

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

Scanner type	Fault location	Probable cause
12	Mass air flow (MAF) sensor	Wiring, MAF sensor, air leak
14	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
15	Fuel temperature sensor	Wiring, fuel temperature sensor
17	Throttle position (TP) sensor	Wiring, TP sensor
18	TP sensor – signal high/MAF sensor – signal low	Wiring, TP sensor, MAF sensor, air leak
18	TP sensor – signal low/MAF sensor – signal high	Wiring, TP sensor, MAF sensor, air restriction
21	Module coding plug	Wiring, coding plug
23	Fuel supply	Fuel supply, air leak, mixture adjustment resistor – without cat
25	Ignition misfire	Ignition system
28	Air leak	Air leak, mechanical fault
29	Engine control module (ECM) – memory fault	ECM



Scanner type	Fault location	Probable cause
34	Injector – bank A	Wiring, injector, air leak
36	Injector – bank B	Wiring, injector, air leak
40	Misfire – bank A	Ignition system, mechanical fault
44	Heated oxygen sensor (HO2S) – A	Wiring, HO2S
45	Heated oxygen sensor (HO2S) – B	Wiring, HO2S
48	Idle air control (IAC) valve	Wiring, IAC valve
50	Misfire – bank B	Ignition system
59	Fuel supply/air leak	Fuel supply, air leak, mechanical fault
68	Vehicle speed sensor (VSS)	Wiring, VSS
69	Park/neutral position (PNP) switch – AT	Wiring, PNP switch
69	Component supplement resistor – MT	Wiring, resistor
88	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve



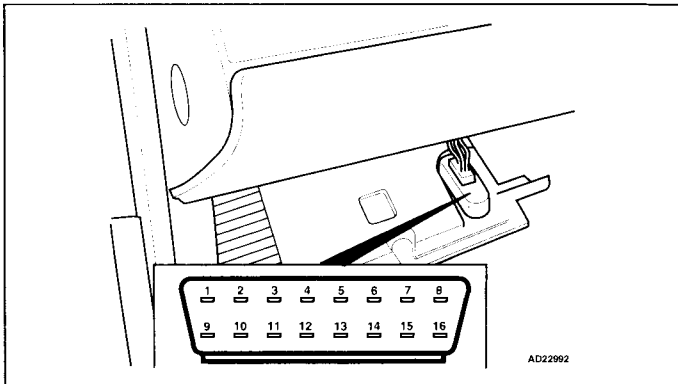


# LAND ROVER

Model: Range Rover 2,5D Turbo  
 Year: 1994-02  
 Engine code: 256T  
 System: Bosch MSA 11

## Engine management

### Data link connector (DLC) locations



Under fascia, passenger's side

### Trouble codes

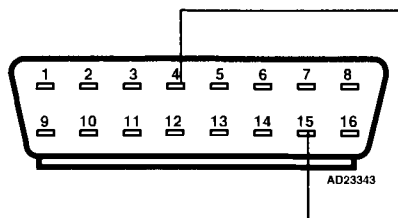
#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

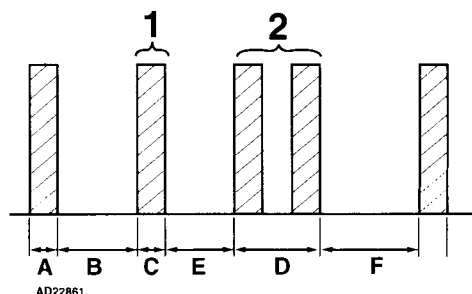
#### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 4 and 15 **1**.
- Switch ignition ON.
- Trouble codes will be displayed after a short flash **2** [A] and a long pause **2** [B].
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of two groups of one or more flashes.
- The first group of flashes indicate the 'tens' of the trouble code **2** [C].
- The second group of flashes indicate the 'units' of the trouble code **2** [D].
- A short pause separates each trouble code group **2** [E].
- A long pause separates each trouble code **2** [F].
- For example: Trouble code 12 displayed **2**.
- Each trouble code including 12 displayed three times.

1



2



#### Erasing

- The engine control module (ECM) fault memory can only be erased using diagnostic equipment connected to the data link connector (DLC).
- Repeat checking procedure to ensure no data remains in ECM fault memory.



**Trouble code identification**

Flash/scanner type	Fault location	Probable cause
12	Start and end of diagnosis – some models	–
14	Engine coolant temperature (ECT) sensor – voltage low	Wiring short to earth, ECT sensor, ECM
15	Engine coolant temperature (ECT) sensor – voltage high	Wiring short to positive/open circuit, ECT sensor, ECM
16	Fuel temperature sensor – voltage low	Wiring short to earth, ECT sensor, ECM
17	Fuel temperature sensor – voltage high	Wiring short to positive/open circuit, ECT sensor, ECM
19	Engine speed (RPM) sensor – incorrect signal	Wiring, RPM sensor, reluctor ring, ECM
21	Accelerator pedal position (APP) sensor – voltage high	Wiring short to positive/open circuit, APP sensor, ECM
23	Accelerator pedal position (APP) sensor – incorrect idle speed signal	Wiring, APP sensor, ECM
24	Vehicle speed sensor (VSS) – no signal	Wiring, VSS, ECM
31	Engine speed (RPM) sensor – no signal	Wiring, RPM sensor
34	Injection timing control – out of range	Wiring, fuel injection pump, ECM
37	Brake pedal position (BPP) switch – incorrect signal	Wiring, BPP switch
39	Immobilizer – activated	Wiring, incorrect key, ECM
41	Manifold absolute pressure (MAP) sensor, TC boost pressure – voltage low	Wiring short to earth, MAP sensor
42	Manifold absolute pressure (MAP) sensor, TC boost pressure – voltage high	Wiring short to positive/open circuit, MAP sensor
43	Manifold absolute pressure (MAP) sensor, TC boost pressure – invalid signal	Wiring, MAP sensor, TC
44	Manifold absolute pressure (MAP) sensor, TC boost pressure – incorrect signal	Wiring, MAP sensor, TC
48	Battery supply voltage – low	Wiring, battery, ECM relay, ECM
49	Glow plug control – circuit malfunction	Wiring, glow plugs, glow plug control module
54	Fuel shut-off solenoid – circuit malfunction	Wiring short to earth, fuel shut-off solenoid
55	Engine control module (ECM) – defective	ECM
61	Fuel quantity adjuster position sensor – incorrect signal	Wiring, fuel quantity adjuster position sensor
64	Fuel quantity adjustment control – malfunction	Wiring, fuel quantity adjuster/position sensor, ECM
65	Engine control module (ECM) – overheating	Wiring, module temperature switch, ambient temperature
73	Intake air temperature (IAT) sensor – voltage low	Wiring short to earth, IAT sensor, ECM
74	Intake air temperature (IAT) sensor – voltage high	Wiring short to positive/open circuit, IAT sensor, ECM
81	Injector needle lift sensor – circuit malfunction	Wiring, injector needle lift sensor
82	Injector needle lift sensor – incorrect signal	Injector needle lift sensor, ECM
83	Immobilizer control module – programming	Immobilizer control module incorrectly/not programmed
84	Immobilizer control module – no signal	Immobilizer control module

**LAND ROVER**

Model: Range Rover 2,5D Turbo

**Engine management**

Flash/scanner type	Fault location	Probable cause
85	Immobilizer control module – incorrect signal	Immobilizer control module
87	Mass air flow (MAF) sensor – voltage high	Wiring short to positive/open circuit, MAF sensor, ECM
88	Mass air flow (MAF) sensor – voltage low	Wiring short to earth, MAF sensor, ECM
89	Mass air flow (MAF) sensor – signal out of range	Wiring, MAF sensor, MAP sensor, ECM
91	Cruise control – signal low	Wiring short to earth
92	Cruise control – signal high	Wiring short to positive/open circuit
95	Engine control module (ECM) – malfunction	ECM
96	Exhaust gas recirculation (EGR) solenoid – voltage low	Wiring short to earth/open circuit, EGR solenoid
97	Fuel injection pump – adaptation failure	Incorrect adjustment



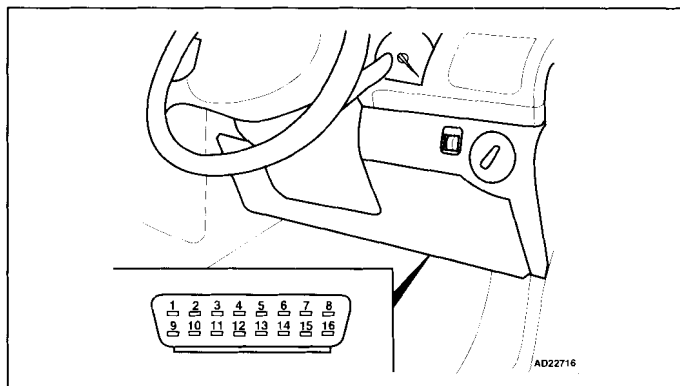
Model: IS200 2,0 • IS300 3,0 • GS300 3,0  
 Year: 1997-04  
 Engine code: 1G-FE, 2JZ-GE  
 System: SFI

**LEXUS**



Engine management

## Data link connector (DLC) locations



## Trouble codes

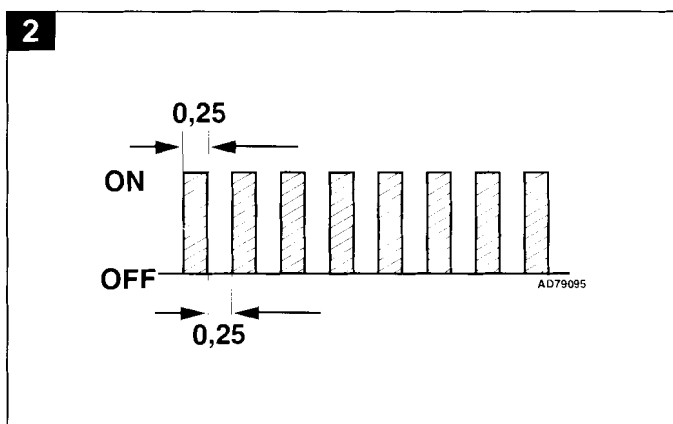
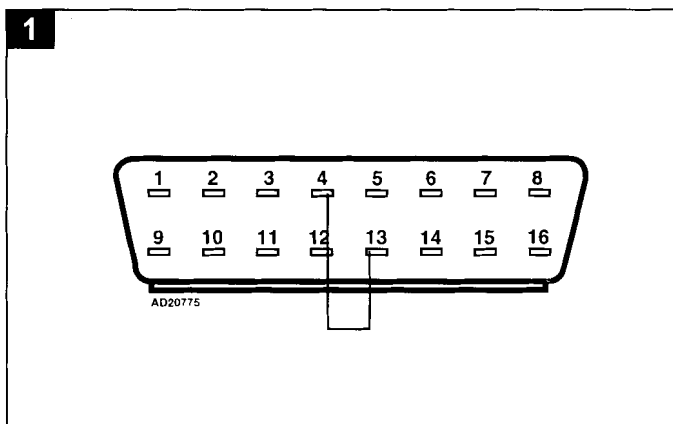
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- →06/00: Trouble codes can be displayed by the MIL or by using diagnostic equipment connected to the data link connector (DLC).
- →06/00: More detailed fault diagnosis information can be obtained using diagnostic equipment connected to the data link connector (DLC).
- 07/00 →: Trouble codes can only be displayed by using diagnostic equipment connected to the data link connector (DLC).

- The engine control module (ECM) fault memory can also be accessed using diagnostic equipment connected to the data link connector (DLC).
- More detailed fault diagnosis information can be obtained using diagnostic equipment connected to the data link connector (DLC).

### Accessing – flash type →06/00

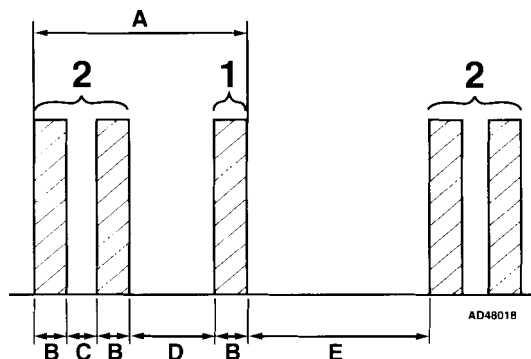
- Switch ignition ON.
- Bridge data link connector (DLC) terminals 4 and 13 **1**.
- If no trouble codes are stored, the lamp will flash twice per second **2**.
- Each trouble code consists of two groups of one or more flashes **3** [A].
- Warning lamp flash duration: 0,5 second **3** [B].
- A 0,5 second pause separates each flash **3** [C].
- A 1,5 second pause separates each trouble code group **3** [D].
- A 2,5 second pause separates each trouble code **3** [E].
- For example: Two 0,5 second flashes – 1,5 second pause – one 0,5 second flash. Trouble code 21 displayed **3** – heated oxygen sensor (HO2S).
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.



**LEXUS**

Model: IS200 2,0 • IS300 3,0 • GS300 3,0

## Engine management

**3****Accessing – EOBD type**

- Trouble codes can only be displayed by using diagnostic equipment connected to the data link connector (DLC).

**Erasing**

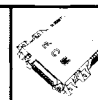
- Ensure ignition switched OFF.
- Disconnect battery earth lead for 30 seconds minimum.
- Reconnect battery earth lead.

**NOTE:** *Disconnecting battery may erase memory from electronic units (e.g. radio, clock).*

- The engine control module (ECM) fault memory can also be erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification**

Flash type	EOBD type	Fault location	Probable cause
–	P0	Refer to EOBD trouble code table	–
12	–	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – circuit malfunction	Wiring, CKP sensor, CMP sensor, starter motor, ECM
13	–	Crankshaft position (CKP) sensor – circuit malfunction	Wiring, CKP sensor, starter motor, ECM
14	–	Ignition control 1/3/4/5/6 – circuit malfunction	Wiring, ignition control module, ECM
15	–	Ignition control 2 – circuit malfunction	Wiring, ignition control module, ECM
18	–	Camshaft position (CMP) sensor – range/performance problem	Timing belt, valve timing, ECM
19	P1120	Accelerator pedal position (APP) sensor – circuit malfunction	Wiring, APP sensor, ECM
19	P1121	Accelerator pedal position (APP) sensor – range/performance problem	APP sensor, ECM
21	–	Heated oxygen sensor (HO2S) 1, bank 1 – circuit malfunction	Heating inoperative, poor connection, wiring, HO2S
22	–	Engine coolant temperature (ECT) sensor – circuit malfunction	Wiring, ECT sensor, ECM
24	–	Intake air temperature (IAT) sensor – circuit malfunction	Wiring, IAT sensor, ECM
25	–	System too lean, bank 1/2	Intake/exhaust leak, AIR system, MAF sensor, fuel pressure/pump, injector(s), HO2S
26	–	System too rich, bank 1	Intake blocked, EVAP canister purge valve, fuel pressure, EGR system, injector(s), HO2S
27	–	Heated oxygen sensor (HO2S) 2, bank 1 – circuit malfunction	Heating inoperative, poor connection, wiring, HO2S
28	–	Heated oxygen sensor (HO2S) 1, bank 2 – circuit malfunction	Heating inoperative, wiring, HO2S, ECM
29	–	Heated oxygen sensor (HO2S) 2, bank 2 – circuit malfunction	Heating inoperative, wiring, HO2S, ECM
31	–	Mass air flow (MAF) sensor/manifold absolute pressure (MAP) sensor – circuit malfunction	Wiring, MAF sensor, MAP sensor, ECM
33	–	Idle speed control (ISC) system – malfunction	Wiring, ISC actuator/IAC valve, throttle motor, throttle valve tight/sticking, ECM



Flash type	EOBD type	Fault location	Probable cause
39	–	Oil control valve – malfunction	Wiring, oil control valve, ECM
41	–	Throttle position (TP) sensor – circuit malfunction	Wiring, TP sensor, ECM
42	–	Vehicle speed sensor (VSS) – circuit malfunction	Wiring, VSS, ECM
52	–	Knock sensor (KS) 1 – circuit malfunction	Wiring, poor connection, KS
55	–	Knock sensor (KS) 2 – circuit malfunction	Wiring, KS, ECM
59	–	Variable valve timing control – circuit malfunction	Valve timing, oil control valve, valve timing control module, ECM
75	–	Power steering pressure (PSP) sensor – circuit malfunction	Wiring, PSP sensor, ECM
78	–	Fuel pump (FP) relay/fuel pump (FP) control module – circuit malfunction	Wiring, FP relay, FP control module, ECM
82	–	Body control module (BCM) – malfunction	Wiring, BCM, AC control module
89	P1125	Throttle actuator control (TAC) motor – circuit malfunction	Wiring, TAC motor, ECM
89	P1126	Throttle actuator control (TAC) clutch – circuit malfunction	Wiring, magnetic clutch, ECM
89	P1127	Throttle actuator control (TAC) power source – circuit malfunction	Wiring, ECM
89	P1128	Throttle actuator control (TAC) lock – malfunction	TAC motor, throttle body, ECM
89	P1129	Throttle actuator control (TAC) system – malfunction	TAC system, ECM
–	P1200	Fuel pump (FP) relay/fuel pump (FP) control module – circuit malfunction	Wiring, FP relay, FP control module, ECM
–	P1300	Ignition control 1 – circuit malfunction	Wiring, ignition control module, ECM
–	P1305	Ignition control 2 – circuit malfunction	Wiring, ignition control module, ECM
–	P1310	Ignition control 3 – circuit malfunction	Wiring, ignition control module, ECM
–	P1315	Ignition control 4 – circuit malfunction	Wiring, ignition control module, ECM
–	P1320	Ignition control 5 – circuit malfunction	Wiring, ignition control module, ECM
–	P1325	Ignition control 6 – circuit malfunction	Wiring, ignition control module, ECM
–	P1335	Crankshaft position (CKP) sensor – no signal	Wiring, CKP sensor, starter motor, ECM
–	P1346	Camshaft position (CMP) sensor – range/performance problem	Timing belt, valve timing, ECM
–	P1349	Variable valve timing control – circuit malfunction	Valve timing, oil control valve, valve timing control module, ECM
–	P1400	Throttle position (TP) sensor 2 – circuit malfunction	Wiring, TP sensor, ECM
–	P1401	Throttle position (TP) sensor 2 – range/performance problem	TP sensor
–	P1500	Starter signal – circuit malfunction	Wiring, ignition switch, starter relay, ECM
–	P1520	Brake pedal position (BPP) switch – signal malfunction	Wiring, BPP switch, ECM
–	P1565	Cruise control master/selector switch – circuit malfunction	Wiring, cruise control master/selector switch, ECM



**LEXUS**

Model: IS200 2,0 • IS300 3,0 • GS300 3,0

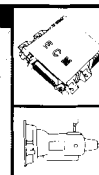
## Engine management

Flash type	EOBD type	Fault location	Probable cause
–	P1600	Engine control module (ECM) – supply voltage	Wiring, fuse, ECM
–	P1605	Knock control – malfunction	ECM
89	P1633	Engine control module (ECM), TAC system – malfunction	ECM
–	P1645	Body control module (BCM) – malfunction	BCM, AC control module, wiring
–	P1651	Intake manifold air control solenoid – malfunction	Wiring, intake manifold air control solenoid, ECM
–	P1656	Oil control valve – malfunction	Wiring, oil control valve, ECM
91	–	Insufficient coolant temperature for closed loop fuel control	Wiring, engine cooling system, coolant thermostat, ECT sensor
93	–	Random/multiple cylinder(s) – misfire detected	Spark plug(s), HT lead(s), injector(s), ignition coil(s), low compression, wiring
93	–	Cylinder 1-6 – misfire detected	Engine mechanical fault, wiring, ignition/fuel system, injector, ECT sensor, MAF sensor, ECM
94	–	Catalytic converter system, bank 1/2 – efficiency below threshold	Catalytic converter, wiring, HO2S 2
94	–	Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring, EVAP canister purge valve, ECM
96	–	Engine control module (ECM) – supply voltage	Wiring, fuse, ECM
96	–	Intake manifold air control solenoid – malfunction	Wiring, intake manifold air control solenoid, ECM
97	P1780	Park/neutral position (PNP) switch	Wiring, PNP switch, ECM
–	B2785	Ignition switch ON – malfunction	Ignition switch, EC relay, wiring
–	B2786	Ignition switch OFF – malfunction	Ignition switch, EC relay, wiring
–	B2791	Key unlock warning switch – malfunction	Wiring, key unlock warning switch, EC relay
99	B2795	Unrecognized key code	Incorrect/damaged key
–	B2796	Immobilizer system – no communication	Key, transponder, wiring, ECM
–	B2797	Communication error 1 – interference	Incorrect key has been used, wiring, ICM, ECM
–	B2798	Communication error 2	Key, transponder, ICM, wiring, ECM



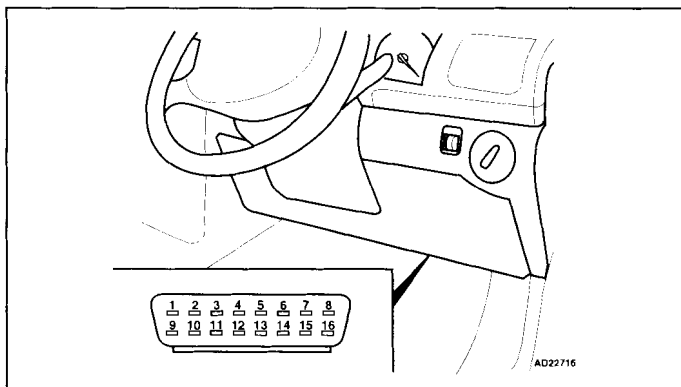
Model: Mazda2 • Mazda6 • Tribute  
 Year: 2001-04  
 Engine code: AJ, F6JA, F8JA, F8JB, FUJA, FXJA, FXJB, FYJA, L8, L3, LF, MZR-CD (RF-Turbo), YF  
 System: EDC • Ford EECV • Mazda EGI • Siemens SFI

**MAZDA**

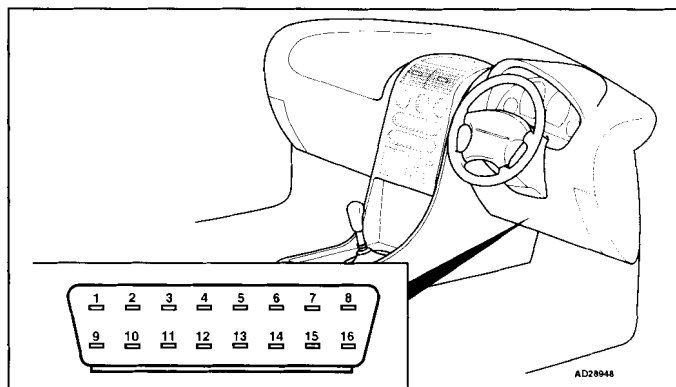


## Engine management/transmission

### Data link connector (DLC) locations



Mazda2



Mazda6, Tribute

### Trouble codes

#### General information

- ☐ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ☐ Engine control module (ECM) incorporates immobilizer control module function.
- ☐ Engine control module (ECM) incorporates transmission control module (TCM) function.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

EOBD type	fault location	Probable cause
B1213	Immobilizer – number of programmed keys below minimum limit	Program additional key(s)
B1600	Immobilizer – transponder signal not received	Incorrect/damaged key, wiring, immobilizer read coil
B1601	Immobilizer – incorrect transponder signal	Incorrect/damaged key, incorrectly programmed, wiring, immobilizer read coil
B1602	Immobilizer – incorrect transponder signal	Incorrect/damaged key, incorrectly programmed, wiring, immobilizer read coil
B1681	Immobilizer read coil – signal not received	Wiring, immobilizer read coil
B2103	Immobilizer read coil – not connected	Multi-plug disconnected, poor connection, wiring, immobilizer read coil
B2139	Immobilizer – challenge response does not match	–
B2141	Immobilizer – no ECM-ID transferred	Incorrectly programmed
B2431	Immobilizer – transponder programming malfunction	Incorrectly programmed
P0	Refer to EOBD trouble code table	–

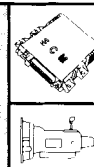
**MAZDA**

Model: Mazda2 • Mazda6 • Tribute

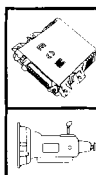
**Engine management/transmission**

<b>EOBD type</b>	<b>fault location</b>	<b>Probable cause</b>
P1000	System readiness test not complete	–
P1001	System diagnosis incomplete	–
P1100	Mass air flow (MAF) sensor – circuit intermittent	Wiring, MAF sensor
P1101	Mass air flow (MAF) sensor – out of self-test range	Wiring, MAF sensor
P1105	Dual alternator upper fault	–
P1106	Dual alternator lower fault	–
P1107	Dual alternator lower circuit	–
P1108	Dual alternator battery lamp circuit	–
P1109	Intake air temperature (IAT) sensor 2 – circuit intermittent	Wiring, IAT sensor
P1111	System pass	–
P1112	Intake air temperature (IAT) sensor – circuit intermittent	Wiring, IAT sensor
P1114	Intake air temperature (IAT) sensor 2 – circuit low – supercharged/turbocharged engines	–
P1115	Intake air temperature (IAT) sensor 2 – circuit high – supercharged/turbocharged engines	Wiring, IAT sensor
P1116	Engine coolant temperature (ECT) sensor – out of self-test range	Wiring, ECT sensor
P1117	Engine coolant temperature (ECT) sensor – circuit intermittent	Wiring, ECT sensor
P1118	Manifold air temperature (MAT) sensor – circuit low	Wiring, MAT sensor, ECM
P1119	Manifold air temperature (MAT) sensor – circuit high	Wiring, MAT sensor, ECM
P1120	Throttle position (TP) sensor – out of range, low	Wiring, TP sensor
P1121	Throttle position (TP) sensor – inconsistent with MAF/ MAP sensor signal	Wiring, MAF/MAP/TP sensor
P1122	Accelerator pedal position (APP) sensor A – circuit low	Wiring, APP sensor, ECM
P1123	Accelerator pedal position (APP) sensor A – circuit high	Wiring, APP sensor, ECM
P1124	Throttle position (TP) sensor – out of self-test range	Wiring, TP sensor
P1125	Throttle position (TP) sensor – circuit intermittent	Wiring, TP sensor
P1127	Exhaust temperature, out of range – O2S tests not complete	Exhaust leak, mechanical fault
P1128	Heated oxygen sensor (HO2S) 1 – transposed	Wiring
P1129	Heated oxygen sensor (HO2S) 2 – transposed	Wiring
P1130	Heated oxygen sensor (HO2S) – fuel trim (FT) at limit	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1131	Heated oxygen sensor (HO2S) – not switching, fuel trim (FT) weak mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1132	Heated oxygen sensor (HO2S) – not switching, fuel trim (FT) rich mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1133	Fuel control shifted lean, bank 1	Fuel pressure, injectors, MAF/MAP sensor, intake leak
P1134	Fuel control shifted rich, bank 1	Fuel pressure, injectors, MAF/MAP sensor, EVAP system
P1135	Accelerator pedal position (APP) sensor A – circuit intermittent	Wiring, APP sensor, ECM





EOBD type	fault location	Probable cause
P1137	Heated oxygen sensor (HO2S) 1, bank 2 – no activity detected, lean mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1138	Heated oxygen sensor (HO2S) 1, bank 2 – no activity detected, rich mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1139	Water in fuel warning lamp – circuit malfunction	Wiring, water in fuel warning lamp
P1140	Water in fuel	Water in fuel
P1141	Fuel restriction warning lamp – circuit malfunction	Wiring, fuel restriction warning lamp
P1142	Fuel restriction	Blocked fuel filter
P1145	Calculated torque error	–
P1147	Manifold air temperature (MAT) sensor/intake air temperature (IAT) sensor – correlation	Wiring, MAT sensor, IAT
P1148	Alternator 2 – control circuit	Wiring, alternator
P1149	Alternator 2 – monitor – voltage high	Wiring, alternator
P1150	Heated oxygen sensor (HO2S) – not switching, fuel trim (FT) at limit	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1151	Heated oxygen sensor (HO2S) – not switching, sensor indicates weak mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1152	Heated oxygen sensor (HO2S) – not switching, sensor indicates rich mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1153	Fuel control shifted lean, bank 2	Fuel pressure, injectors, MAF/MAP sensor, intake leak
P1154	Fuel control shifted rich, bank 2	Fuel pressure, injectors, MAF/MAP sensor, EVAP system
P1155	Alternative fuel control module has activated the MIL	–
P1157	Heated oxygen sensor (HO2S) 2, bank 2 – no activity detected, lean mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1158	Heated oxygen sensor (HO2S) 2, bank 2 – no activity detected, rich mixture	Intake/fuel system, injectors, HO2S, MAF sensor, ECT sensor
P1170	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid
P1171	Rotor sensor	–
P1172	Rotor control	–
P1173	Rotor calibration	–
P1174	Cam sensor	–
P1175	Cam control	–
P1176	Cam calibration	–
P1177	Synchronization	–
P1178	Boltup limits	–
P1183	Engine oil temperature (EOT) sensor – circuit malfunction	Wiring, engine oil temperature sensor
P1184	Engine oil temperature (EOT) sensor – out of self test range	Wiring, engine oil temperature sensor
P1185	Fuel pump (FP) temperature sensor – voltage high	Wiring, FP temperature sensor
P1186	Fuel pump (FP) temperature sensor – voltage low	Wiring, FP temperature sensor
P1187	Variant selection	ECM incorrectly coded

**MAZDA**

Model: Mazda2 • Mazda6 • Tribute

**Engine management/transmission**

<b>EOBD type</b>	<b>fault location</b>	<b>Probable cause</b>
P1188	Calibration memory	–
P1189	Injection pump speed signal	Wiring, injection pump speed sensor, ECM
P1190	Calibration resistor out of range	Wiring, calibration resistor
P1191	Key line voltage	–
P1192	V external	–
P1193	EGR driver over current	Wiring, EGR solenoid
P1194	Engine control module (ECM) analogue/digital converter	ECM
P1195	Engine control module (ECM) – communications chip failed to initialize	ECM
P1196	Key off voltage high	Wiring, engine control relay
P1197	Key off voltage low	Wiring, engine control relay
P1198	Injection pump rotor control – underfueling	–
P1199	Fuel level position sensor – input circuit low	Wiring, fuel level position sensor
P1200	Injector – range/performance problem	Wiring, injector, ECM
P1209	Fuel pressure control – test fault	Wiring, fuel pressure sensor, fuel pressure control solenoid, ECM
P1210	Fuel pressure, engine OFF – higher than expected	–
P1211	Fuel pressure – high/low	Wiring, fuel pressure sensor, fuel pressure control solenoid, fuel pump, ECM
P1212	Fuel pressure, engine cranking/running – lower than expected	Wiring, fuel pressure sensor, fuel pressure control solenoid, fuel pump, ECM
P1214	Accelerator pedal position (APP) sensor B – circuit intermittent	Wiring, APP sensor
P1215	Accelerator pedal position (APP) sensor C – circuit low input	Wiring, APP sensor
P1216	Accelerator pedal position (APP) sensor C – circuit high input	Wiring, APP sensor
P1217	Accelerator pedal position (APP) sensor C – circuit intermittent	Wiring, APP sensor
P1218	Camshaft position (CMP) sensor – voltage high	Wiring, CMP sensor
P1219	Camshaft position (CMP) sensor – voltage low	Wiring, CMP sensor
P1220	Series throttle control system	–
P1221	Traction control system (TCS)	–
P1222	Accelerator pedal position (APP) sensor B – circuit low	Wiring, APP sensor
P1223	Accelerator pedal position (APP) sensor B – circuit high	Wiring, APP sensor
P1223	Redundant emergency stop	–
P1224	Throttle position (TP) sensor B – out of self test range	Wiring, TP sensor
P1225	Injector needle lift sensor	Wiring, dirty fuel, air in fuel, injector needle lift sensor
P1226	Fuel quantity adjuster position sensor – circuit malfunction	Wiring, fuel quantity adjuster position sensor
P1227	Fuel injection timing solenoid	Wiring, dirty fuel, air in fuel, fuel injection timing solenoid
P1228	Vehicle speed governor	Wiring, vehicle speed governor



EOBD type	fault location	Probable cause
P1229	Fuel injection timing solenoid	Wiring, dirty fuel, air in fuel, fuel injection timing solenoid
P1230	Fuel pump (FP) – low speed malfunction	Wiring, fuel pump
P1231	Fuel pump (FP) – secondary circuit low, high speed	Wiring, fuel pump
P1232	Fuel pump (FP) speed – primary circuit, two speed fuel pump	Wiring, fuel pump
P1233	Fuel pump (FP) – control module disabled or off line	Wiring, fuel pump, ECM
P1234	Fuel pump (FP) – control module disabled or off line	Wiring, fuel pump, ECM
P1235	Fuel pump (FP) control – out of range	Wiring, FP control module
P1236	Fuel pump (FP) control – out of range	Wiring, FP control module
P1237	Fuel pump (FP) – secondary circuit malfunction	Wiring, FP control module
P1238	Fuel pump (FP) – secondary circuit malfunction	Wiring, FP, FP control module
P1239	Speed fuel pump (FP) positive feed	–
P1240	Sensor power supply	Wiring, ECM
P1243	Second fuel pump (FP) – malfunction, earth fault	Wiring, fuel pump (FP)
P1244	Alternator – high input	Wiring, alternator
P1245	Alternator – low input	Wiring, alternator
P1246	Alternator	Wiring, alternator
P1247	Turbocharger boost pressure low	Wiring, turbocharger (TC) wastegate actuator, turbocharger
P1248	Turbocharger boost pressure not detected	Wiring, turbocharger
P1249	Wastegate control valve – performance	Turbocharger
P1252	Accelerator pedal position (APP) sensor – signal correlation, high	Wiring, APP sensor
P1253	Accelerator pedal position (APP) sensor – signal correlation, low	Wiring, APP sensor
P1254	Accelerator pedal position (APP) sensor – signal correlation, high	Wiring, APP sensor
P1255	Accelerator pedal position (APP) sensor – signal correlation, low	Wiring, APP sensor
P1256	Accelerator pedal position (APP) sensor – signal correlation	Wiring, APP sensor
P1257	Accelerator pedal position (APP) sensor – signal correlation	Wiring, APP sensor
P1258	Accelerator pedal position (APP) sensor – signal correlation	Wiring, APP sensor
P1260	Theft detected – vehicle immobilized	–
P1261	Injector 1 – short circuit	Wiring, injector, ECM
P1262	Injector 2 – short circuit	Wiring, injector, ECM
P1263	Injector 3 – short circuit	Wiring, injector, ECM
P1264	Injector 4 – short circuit	Wiring, injector, ECM
P1265	Injector 5 – short circuit	Wiring, injector, ECM
P1266	Injector 6 – short circuit	Wiring, injector, ECM
P1270	Maximum engine RPM or vehicle speed limit reached	–



**MAZDA**

Model: Mazda2 • Mazda6 • Tribute



Engine management/transmission

EOBD type	fault location	Probable cause
P1271	Injector 1 – short circuit	Wiring, injector, ECM
P1272	Injector 2 – short circuit	Wiring, injector, ECM
P1273	Injector 3 – short circuit	Wiring, injector, ECM
P1274	Injector 4 – short circuit	Wiring, injector, ECM
P1275	Injector 5 – short circuit	Wiring, injector, ECM
P1276	Injector 6 – short circuit	Wiring, injector, ECM
P1280	Injector control pressure sensor – voltage low	Wiring, injector control pressure sensor, ECM
P1281	Injector control pressure sensor – voltage high	Wiring, injector control pressure sensor, ECM
P1282	Injector control pressure higher than desired – engine running	Wiring, injector control pressure sensor, ECM
P1283	Injector pressure regulator – control circuit	Wiring, injector, ECM
P1284	Injector control pressure failure	Wiring, injector, injector control pressure sensor, ECM
P1285	Cylinder head temperature (CHT) sensor – over-temperature condition	Wiring, cooling system fault, CHT sensor
P1286	Fuel pulse width in range but lower than expected	–
P1287	Fuel pulse width in range but higher than expected	–
P1288	Cylinder head temperature (CHT) sensor – out of self-test range	Wiring, cooling system fault, CHT sensor
P1289	Cylinder head temperature (CHT) sensor – high input	Wiring, cooling system fault, CHT sensor
P1290	Cylinder head temperature (CHT) sensor – low input	Wiring, cooling system fault, CHT sensor
P1291	Injector, bank 1 – short circuit to positive/earth	Wiring, injector, ECM
P1292	Injector, bank 2 – short circuit to positive/earth	Wiring, injector, ECM
P1293	Injector, bank 1 – open circuit	Wiring, injector, ECM
P1294	Injector, bank 2 – open circuit	Wiring, injector, ECM
P1295	Injector, bank 1 – multiple faults	Wiring
P1296	Injector, bank 2 – multiple faults	Wiring
P1297	Injectors – shorted together	Wiring, ECM
P1298	Injector control module	Injector control module
P1299	Cylinder head temperature (CHT) sensor – over-temperature protection system activated	Wiring, cooling system fault, CHT sensor
P1300	Boost calibration fault	–
P1301	Boost calibration – high	–
P1302	Boost calibration – low	–
P1303	Exhaust gas recirculation (EGR) system – calibration fault	–
P1304	Exhaust gas recirculation (EGR) system – calibration high	–
P1305	Exhaust gas recirculation (EGR) system – calibration low	–
P1306	Transmission kick-down relay – pull in circuit malfunction	Wiring, transmission kick-down relay
P1307	Transmission kick-down relay – hold circuit malfunction	Wiring, transmission kick-down relay



<b>EOBD type</b>	<b>fault location</b>	<b>Probable cause</b>
P1308	AC compressor clutch – circuit malfunction	Wiring, AC compressor clutch
P1309	Misfire monitor hardware – CMP misaligned, CKP/CMP noise, ECM internal fault	CKP sensor, CMP sensor, mechanical fault, ECM
P1310	Ionization misfire detection module	Ionization misfire detection module
P1311	Ionization misfire detection module – communication fault	Wiring, ionization misfire detection module
P1316	Injector driver module – trouble codes stored	Check trouble codes
P1317	Injector circuit/injector driver module – codes not retrieved	–
P1329	Injector control pressure – higher than desired, engine running	–
P1330	Injector control pressure – lower than desired, engine running	–
P1331	Turbocharger/supercharger boost, high side – control open circuit	Wiring, turbocharger (TC) wastegate actuator, supercharger (SC) bypass valve
P1332	Turbocharger/supercharger boost, high side – control voltage low	Wiring, turbocharger (TC) wastegate actuator, supercharger (SC) bypass valve
P1333	Turbocharger/supercharger boost, high side – control voltage high	Wiring, turbocharger (TC) wastegate actuator, supercharger (SC) bypass valve
P1334	Exhaust gas recirculation (EGR) throttle position sensor – minimum/maximum stop performance	Wiring, EGR throttle position sensor
P1335	Exhaust gas recirculation (EGR) valve position sensor – minimum/maximum stop performance	Wiring, EGR valve position sensor
P1336	Crankshaft/camshaft sensor – range/performance problem	Wiring, CMP sensor, mechanical fault
P1337	Throttle position – output circuit	Wiring, TP sensor
P1340	Camshaft position (CMP) sensor, circuit B – circuit malfunction	Wiring, CMP sensor
P1341	Camshaft position (CMP) sensor, circuit B – range/performance problem	Wiring, CMP sensor
P1342	Accelerator pedal position (APP) sensor, A – range/performance problem	Wiring, APP sensor, ECM
P1343	Accelerator pedal position (APP) sensor, B – range/performance problem	Wiring, APP sensor, ECM
P1344	Accelerator pedal position (APP) sensor, C range/performance problem	Wiring, APP sensor, ECM
P1351	Ignition system diagnostic monitor – input circuit malfunction	Wiring, ignition control module, ECM
P1352	Ignition coil A – primary circuit malfunction	Wiring, ignition coil
P1353	Ignition coil B – primary circuit malfunction	Wiring, ignition coil
P1354	Ignition coil C – primary circuit malfunction	Wiring, ignition coil
P1355	Ignition coil D – primary circuit malfunction	Wiring, ignition coil
P1356	Ignition system diagnostic monitor indicates engine not turning	–
P1357	Ignition system diagnostic monitor pulse width not defined	–

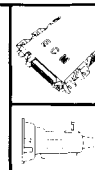
**MAZDA**

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Engine management/transmission

EOBD type	fault location	Probable cause
P1358	Ignition system diagnostic monitor – signal out of self-test range	Wiring, ignition control module, ECM
P1359	Ignition system – spark output (SPOUT) signal – circuit malfunction	Wiring, ignition control module, ECM
P1360	Ignition coil A – secondary circuit malfunction	Wiring, ignition coil
P1361	Ignition coil B – secondary circuit malfunction	Wiring, ignition coil
P1362	Ignition coil C – secondary circuit malfunction	Wiring, ignition coil
P1363	Ignition coil D – secondary circuit malfunction	Wiring, ignition coil
P1364	Ignition coil – primary circuit malfunction	Wiring, ignition coil
P1365	Ignition coil – secondary circuit malfunction	Wiring, HT leads, spark plugs, distributor, ignition coil
P1366	Ignition spare	–
P1367	Ignition spare	–
P1368	Ignition spare	–
P1369	Engine temperature warning lamp – circuit malfunction	Wiring, fuses, instruments assembly
P1377	Injector – over voltage shut-down	Wiring, alternator
P1378	Fuel injector control module – system voltage low	Wiring, alternator, battery
P1379	Fuel injector control module – system voltage high	Wiring, alternator, battery
P1380	Camshaft position (CMP) actuator – circuit malfunction	Wiring, CMP actuator
P1381	Camshaft position (CMP) actuator – timing over advanced	Wiring, timing belt/chain, CMP actuator
P1383	Camshaft position (CMP) actuator – timing over retarded	Wiring, timing belt/chain, CMP actuator
P1385	Camshaft position (CMP) actuator, bank 2 circuit malfunction	Wiring, CMP actuator
P1386	Camshaft position timing, bank 2 – over advanced	–
P1388	Camshaft position timing, bank 2 – over retarded	–
P1389	Glow plug – circuit malfunction	Wiring, glow plug
P1390	Octane coding plug – in use/open circuit	Wiring
P1391	Glow plug, bank 1 – low input	Wiring open circuit/short to earth, fuse, poor connection, glow plug relay, glow plug, ECM
P1392	Glow plug, bank 1 – high input	Wiring short to positive, glow plug relay, glow plug, ECM
P1393	Glow plug, bank 2 – low input	Wiring open circuit/short to earth, fuse, poor connection, glow plug relay, glow plug, ECM
P1394	Glow plug, bank 2 – high input	Wiring short to positive, glow plug relay, glow plug, ECM
P1395	Glow plug monitor fault, bank 1	Wiring
P1396	Glow plug monitor fault, bank 2	Wiring
P1397	System voltage out of self test range	Wiring, battery, alternator
P1399	Glow plug – circuit malfunction	Wiring, glow plug
P1400	Exhaust gas recirculation (EGR) pressure sensor – circuit malfunction, low input	Wiring, EGR pressure sensor
P1401	Exhaust gas recirculation (EGR) pressure sensor – circuit malfunction, high input	Wiring, EGR pressure sensor



<b>EOBD type</b>	<b>fault location</b>	<b>Probable cause</b>
P1402	Exhaust gas recirculation (EGR) system – metering orifice restricted	Metering orifice
P1403	Differential pressure feedback sensor, EGR system – hoses transposed	Hoses transposed
P1404	Exhaust gas recirculation (EGR) temperature sensor – circuit malfunction	Wiring, EGR temperature sensor
P1405	Exhaust gas recirculation (EGR) system – upstream hose off or plugged	EGR hoses
P1406	Exhaust gas recirculation (EGR) system – downstream hose off or blocked	EGR hoses
P1407	Exhaust gas recirculation (EGR) – no flow detected	Hoses blocked/leaking, EGR valve
P1408	Exhaust gas recirculation (EGR) – flow out of self-test range	Wiring, EGR solenoid, EGR valve
P1409	Exhaust gas recirculation (EGR) solenoid – circuit malfunction	Wiring, EGR solenoid
P1410	Air filter inlet control solenoid – circuit malfunction	Wiring, air filter inlet control solenoid
P1411	Secondary air injection (AIR) incorrect downstream flow detected	Wiring, AIR relay, mechanical fault
P1412	Exhaust gas recirculation (EGR) valve – seized	EGR valve
P1413	Secondary air injection (AIR) monitor circuit – low input	Wiring, AIR solenoid
P1414	Secondary air injection (AIR) monitor circuit – high input	Wiring, AIR solenoid
P1420	Catalytic converter temperature sensor	Wiring, catalytic converter temperature sensor
P1421	Catalytic converter – damage condition limit	Wiring, catalytic converter temperature sensor
P1422	Exhaust gas ignition – temperature sensor	Wiring, exhaust gas temperature sensor
P1423	Exhaust gas ignition – functional test	–
P1424	Exhaust gas ignition – primary plug	–
P1425	Exhaust gas ignition – secondary plug	–
P1426	Exhaust gas ignition – MAF sensor signal, out of range	Wiring, MAF sensor, ECM
P1427	Exhaust gas ignition – MAF sensor signal, short circuit	Wiring, MAF sensor, ECM
P1428	Exhaust gas ignition – MAF sensor signal, open circuit	Wiring, MAF sensor, ECM
P1429	Electric air pump – primary	Wiring, electric air pump
P1430	Electric air pump – secondary	Wiring, electric air pump
P1431	Misfire monitor disabled, unable to learn wheel profile	–
P1432	Engine thermostat heater – circuit malfunction	Wiring, engine thermostat heater
P1436	AC evaporator temperature sensor – voltage low	Wiring, AC evaporator temperature sensor
P1437	AC evaporator temperature sensor – voltage high	Wiring, AC evaporator temperature sensor
P1442	Evaporative emission (EVAP) system – control leak detected	Hose connection(s), fuel tank filler cap leak, EVAP canister purge valve
P1443	Evaporative emission (EVAP) control valve – low/no flow	Hose connection(s), EVAP canister purge valve
P1444	Evaporative emission (EVAP) purge flow sensor – voltage low	Wiring, EVAP purge flow sensor
P1445	Evaporative emission (EVAP) purge flow sensor – voltage high	Wiring, EVAP purge flow sensor



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EOBD type	fault location	Probable cause
P1450	Evaporative emission (EVAP) system – unable to vacuum fuel tank	Hoses blocked/leaking, EVAP vacuum valve
P1451	Evaporative emission (EVAP) vent control valve – circuit malfunction	Wiring, EVAP vent control valve
P1452	Evaporative emission (EVAP) system – unable to vacuum fuel tank	Hoses blocked/leaking, EVAP vacuum valve
P1459	AC recirculation switch – out of self test range	Wiring, AC recirculation switch
P1460	Wide open throttle (WOT) signal (AC cut-out) – circuit malfunction	Wiring, TP switch/sensor
P1461	AC refrigerant pressure switch – voltage high	Wiring, AC refrigerant pressure switch
P1462	AC refrigerant pressure sensor – voltage low	Wiring, AC refrigerant pressure sensor
P1463	AC refrigerant pressure sensor – insufficient pressure change	Wiring, AC refrigerant pressure sensor
P1464	AC request – out of self-test range	Wiring, AC relay
P1465	AC relay – circuit malfunction	Wiring, AC relay
P1466	AC refrigerant temperature sensor – circuit malfunction	Wiring, AC refrigerant temperature sensor
P1467	AC compressor temperature sensor	Wiring, AC compressor temperature sensor
P1468	Shift solenoid (SS) open/short circuit	Wiring, SS
P1469	Rapid AC system – rapid cycling	Wiring, AC refrigerant switch/pressure sensor, AC refrigerant system fault
P1470	AC compressor clutch – cycling period too short	AC refrigerant charge high
P1473	Engine coolant blower motor – open circuit	Wiring, engine coolant blower motor, engine coolant blower motor relay
P1474	Engine coolant blower motor – control circuit malfunction	Wiring, engine coolant blower motor relay
P1477	Additional fan relay – circuit malfunction	Wiring, additional fan relay
P1478	Engine coolant blower motor – driver failure	Wiring, ECM
P1479	Engine coolant blower motor (high blower speed) – control circuit malfunction	Wiring, engine coolant blower motor relay
P1480	Engine coolant blower motor – secondary low with low fan on	–
P1481	Engine coolant blower motor (low blower speed) – with high speed fan ON	Wiring, engine coolant blower motor relay
P1482	Communication link	Wiring, ECM
P1483	Engine coolant blower motor – short circuit to earth	Wiring, engine coolant blower motor
P1484	Engine coolant blower motor – driver circuit open to positive/earth	Wiring, ECM
P1488	Exhaust silencer bypass control – circuit malfunction	Wiring, exhaust silencer bypass control solenoid
P1500	Vehicle speed sensor (VSS)	Wiring, VSS
P1501	Vehicle speed sensor (VSS) – out of self-test range	Wiring, VSS
P1502	Vehicle speed sensor (VSS) – intermittent operation	Wiring, VSS
P1503	Auxiliary speed sensor	Wiring, auxiliary speed sensor
P1504	Idle air control (IAC) valve – circuit malfunction	Wiring, IAC valve
P1505	Idle air control (IAC) system – adaptive fault	Wiring, IAC valve, intake leak
P1506	Idle air control (IAC) valve – over-speed error	Wiring, air leak, TP sensor, IAC valve





<b>EOBD type</b>	<b>fault location</b>	<b>Probable cause</b>
P1507	Idle air control (IAC) valve – under-speed error	Wiring, TP sensor, IAC valve
P1508	Idle up solenoid 1 – circuit malfunction	Wiring, idle up solenoid
P1512	Intake manifold air control solenoid, bank 1 – stuck closed	Intake manifold air control solenoid, mechanical fault
P1513	Intake manifold air control solenoid, bank 2 – stuck closed	Intake manifold air control solenoid, mechanical fault
P1516	Intake manifold air control solenoid, bank 1 – input error	Wiring, intake manifold air control solenoid, ECM
P1517	Intake manifold air control solenoid, bank 2 – input error	Intake manifold air control solenoid, mechanical fault
P1518	Intake manifold air control solenoid, bank 1 – stuck open	Intake manifold air control solenoid, mechanical fault
P1519	Intake manifold air control solenoid, bank 1 – stuck closed	Intake manifold air control solenoid, mechanical fault
P1520	Intake manifold air control solenoid – circuit malfunction	Wiring, intake manifold air control solenoid, ECM
P1530	AC compressor clutch – open circuit	Wiring, AC compressor clutch
P1531	Invalid test – accelerator pedal movement during test	Accelerator pedal movement during test
P1532	Intake manifold communication, bank 2 – control circuit malfunction	Wiring, ECM
P1533	Air assisted injector – circuit malfunction	Wiring
P1534	Restraint deployment indicator – circuit malfunction	Wiring
P1536	Handbrake warning lamp switch – circuit malfunction	Wiring, handbrake warning lamp switch
P1537	Intake manifold air control solenoid, bank 1 – stuck open	Intake manifold air control solenoid, mechanical fault
P1538	Intake manifold air control solenoid, bank 2 – stuck open	Intake manifold air control solenoid, mechanical fault
P1539	AC compressor clutch – over current/short circuit	Wiring, AC compressor clutch
P1538	Intake manifold air control solenoid – range/performance	Wiring, intake manifold air control solenoid, mechanical fault
P1542	Primary ECM ID circuit (dual ECM application)	Wiring
P1543	Engine coolant heater, A – control circuit malfunction	Wiring, engine coolant heater relay, ECM
P1544	Engine coolant heater, B – control circuit malfunction	Wiring, engine coolant heater relay, ECM
P1545	Exhaust gas recirculation (EGR) control – open circuit	Wiring, EGR solenoid, ECM
P1546	Exhaust gas recirculation (EGR) control – voltage low	Wiring, EGR solenoid, ECM
P1547	Exhaust gas recirculation (EGR) control – voltage high	Wiring, EGR solenoid, ECM
P1549	Intake manifold air control solenoid, bank 1 – control circuit malfunction	Wiring, mechanical fault, ECM
P1550	Power steering pressure (PSP) sensor – out of self test range	Wiring, PSP sensor
P1551	Injector 1 – range/performance problem	Wiring, injector, ECM
P1552	Injector 2 – range/performance problem	Wiring, injector, ECM
P1553	Injector 3 – range/performance problem	Wiring, injector, ECM
P1554	Injector 4 – range/performance problem	Wiring, injector, ECM
P1555	Injector 5 – range/performance problem	Wiring, injector, ECM
P1556	Injector 6 – range/performance problem	Wiring, injector, ECM



**MAZDA**

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**Engine management/transmission**

<b>EOBD type</b>	<b>fault location</b>	<b>Probable cause</b>
P1562	Engine control module (ECM) – supply voltage low	Battery, alternator, wiring, ECM
P1563	Fuel injection pump – engine stop request	Wiring, fuel injection pump, ECM
P1564	Fuel injection pump – reduced fuel mode request	Wiring, fuel injection pump, ECM
P1565	Cruise control master switch – out of range, voltage high	Wiring, cruise control master switch, ECM
P1566	Cruise control master switch – out of range, voltage low	Wiring, cruise control master switch, ECM
P1567	Cruise control – output driver circuit malfunction	Wiring, cruise control actuator, ECM
P1568	Cruise control – unable to hold speed	Wiring, cruise control actuator, cruise control actuator control cable
P1572	Brake pedal position (BPP) switch – circuit malfunction	Wiring, BPP switch
P1573	Throttle position (TP) not available	–
P1574	Throttle position (TP) sensor – outputs disagree	Wiring, TP sensor
P1575	Accelerator pedal position (APP) sensor – out of self test range	Wiring, APP sensor, ECM
P1576	Accelerator pedal position (APP) sensor – not available	Wiring, APP sensor, ECM
P1577	Accelerator pedal position (APP) sensor – outputs disagree	Wiring, APP sensor, ECM
P1578	Throttle actuator control (TAC) monitor – power less than demand	Wiring, throttle body, ECM
P1579	Throttle actuator control (TAC) monitor – power limiting mode	Wiring, throttle body, ECM
P1580	Throttle actuator control (TAC) monitor – ECM override	Wiring, throttle body, ECM
P1581	Throttle actuator control (TAC) monitor – malfunction	Wiring, throttle body, ECM
P1582	Throttle actuator control (TAC) monitor – data available	Wiring, throttle body, ECM
P1583	Throttle actuator control (TAC) monitor – cruise disablement	Wiring, throttle body, ECM
P1584	Throttle actuator control (TAC) monitor – throttle body malfunction	Throttle body
P1585	Throttle actuator control (TAC) monitor – malfunction	Wiring, throttle body, ECM
P1586	Throttle actuator control (TAC) monitor – communication error	Wiring, ECM
P1587	Throttle actuator control (TAC) monitor – modulated command malfunction	Wiring, throttle body, ECM
P1588	Throttle actuator control (TAC) monitor – detected loss of return spring	Throttle body
P1589	Throttle actuator control (TAC) monitor – unable to control to desired throttle angle	Wiring, throttle body, ECM
P1600	Loss of keep alive power supply	Wiring, fuses, battery
P1605	Keep alive memory – test failure	Wiring, ECM
P1608	Signal monitoring malfunction	Wiring, injection pump control module, ECM
P1609	Malfunction indicator lamp (MIL) – driver failure	Wiring, ECM
P1610	Interactive reprogramming code – replace module	ECM
P1611	Interactive reprogramming code – diagnose further	–
P1612	Interactive reprogramming code – repeat test, engine is cranking	–
P1613	Interactive reprogramming code – TBD	–



<b>EOBD type</b>	<b>fault location</b>	<b>Probable cause</b>
P1614	Interactive reprogramming code – TBD	–
P1615	Interactive reprogramming code – erase error	–
P1616	Interactive reprogramming code – erase error, low voltage	–
P1617	Interactive reprogramming code – block program error	–
P1618	Interactive reprogramming code – block program error, low voltage	–
P1619	Interactive reprogramming code – total checksum error	–
P1620	Interactive reprogramming code – overlay checksum error	–
P1625	Engine coolant blower motor, driver – open circuit to positive	Wiring, ECM
P1626	AC system – open circuit	Wiring
P1627	Engine control module (ECM) – supply voltage out of range	Battery, alternator
P1627	Engine control module (ECM) – supply voltage out of range	Wiring, fuses, battery, engine control relay
P1628	Engine control module (ECM) – supply voltage	Wiring, fuses, battery, engine control relay
P1629	Engine control module (ECM) – internal voltage regulator	Earth points, ECM
P1630	Engine control module (ECM) – internal reference voltage	Earth points, ECM
P1631	Engine control relay	Wiring, engine control relay
P1632	Alternator – command malfunction	Wiring, alternator
P1633	Keep alive power supply – voltage too low	Wiring, battery, alternator
P1634	Data output link – circuit malfunction	Wiring
P1635	Tyre/axle out of acceptable range	Incorrect tyre size, incorrect axle ratio, ECM not programmed
P1636	Engine control module (ECM) – inductive signature chip error	ECM
P1639	Engine control module (ECM) not programmed	–
P1640	Powertrain trouble codes available in another control module	–
P1641	Fuel pump – circuit malfunction	Wiring, fuel pump relay, fuel pump, ECM
P1642	Controller area network (CAN) – circuit malfunction	Wiring
P1643	Controller area network (CAN) – module network circuit error	Wiring
P1644	Fuel pump (FP) speed control – circuit malfunction	Wiring, FP control module, ECM
P1650	Power steering pressure (PSP) switch – out of self-test range	Wiring, PSP switch
P1651	Power steering pressure (PSP) switch – input	Wiring, PSP switch
P1656	Controller area network (CAN) – circuit malfunction	Wiring
P1657	Controller area network (CAN) – malfunction	Wiring, ECM
P1658	Fuel injection pump – supply voltage out of range	Wiring, engine control relay, ECM
P1659	Fuel injection pump – supply voltage	Wiring, engine control relay, ECM



**MAZDA**

Model: Mazda2 • Mazda6 • Tribute

**Engine management/transmission**

<b>EOBD type</b>	<b>fault location</b>	<b>Probable cause</b>
P1660	Engine control module (ECM) – output check circuit – voltage high	System voltage high, ECM
P1661	Engine control module (ECM) – output check circuit – voltage high	System voltage low, ECM
P1662	ECM EN output – circuit malfunction	Wiring, fuses, engine control relay
P1663	Fuel demand – command signal output circuit malfunction	Wiring, ECM
P1664	Fuel injection pump – malfunction	Wiring, fuel injection pump, ECM
P1665	Fuel injection pump – communication	Wiring, fuel injection pump control module, ECM
P1666	Fuel injection pump – crankshaft position (CKP) sensor synchronisation	Wiring, CKP sensor, injector needle lift sensor, fuel injection pump control module, ECM
P1667	Camshaft position (CMP) sensor – circuit malfunction	Wiring, CMP sensor
P1668	Fuel injection pump – communication signal lost	Wiring, fuel injection pump control module, ECM
P1669	Fuel injection pump – monitor, mechanical fault	Wiring, fuel injection pump, ECM
P1670	Electronic feedback signal not detected	–
P1673	ABS warning lamp – control circuit malfunction	Wiring, ABS control unit, ECM
P1674	Engine control module (ECM) – software corrupted	ECM
P1690	Turbocharger (TC) wastegate regulating valve – circuit malfunction	Wiring, TC wastegate regulating valve
P1695	Controller area network (CAN) data bus – fuel injection pump data	Wiring, fuel injection pump control module, ECM
P1700	Transmission – neutral position fault	Wiring, transmission
P1701	Reverse gear engagement error	–
P1702	Transmission range (TR) sensor – circuit intermittent	Wiring, TR sensor
P1703	Brake pedal position (BPP) switch – out of self-test range	Wiring, BPP switch
P1704	Transmission range (TR) sensor – circuit not indicating park/neutral during self test	Wiring, TR sensor, ECM
P1705	Transmission range (TR) switch – not in P/N during self-test	Wiring, TR switch, ECM
P1706	High vehicle speed observed in park	Wiring, TR sensor, ECM
P1707	Transfer case neutral warning lamp – circuit malfunction	Wiring, neutral position switch, instruments
P1709	Park/neutral position (PNP) switch/clutch pedal position (CPP) switch – out of self-test range	Wiring, PNP switch, CPP switch, ECM
P1710	Transmission control module – solenoid/internal earth circuit malfunction	Wiring, SS solenoid
P1711	Transmission fluid temperature (TFT) sensor – out of self test range	Wiring, TFT sensor
P1712	Transmission torque reduction system – request signal error	Wiring, TP sensor, ECM
P1713	Transmission fluid temperature (TFT) sensor – range/performance	Wiring, TFT sensor
P1714	Shift solenoid (SS) A – inductive fault	Wiring, SS, ECM
P1715	Shift solenoid (SS) B – inductive fault	Wiring, SS, ECM
P1716	Shift solenoid (SS) C – inductive fault	Wiring, SS, ECM



<b>EOBD type</b>	<b>fault location</b>	<b>Probable cause</b>
P1717	Shift solenoid (SS) D – inductive fault	Wiring, SS, ECM
P1718	Transmission fluid temperature (TFT) sensor – range/performance	Wiring, TFT sensor
P1725	Insufficient engine speed increase during self test	Insufficient engine speed increase during self test
P1726	Insufficient engine speed decrease during self test	Insufficient engine speed decrease during self test
P1727	Coast clutch solenoid (CCS) solenoid – inductive fault	Wiring, CCS solenoid, ECM
P1728	Transmission slip	Transmission mechanical fault
P1729	Transmission range (TR) switch (4x4) – circuit malfunction	Wiring, TR switch
P1732	Transmission shift malfunction, 2-3	Transmission mechanical fault
P1733	Transmission shift malfunction, 3-4	Transmission mechanical fault Transmission mechanical fault
P1734	Transmission shift malfunction, 4-5	Transmission mechanical fault
P1740	Torque converter clutch (TCC) solenoid – inductive fault	Wiring, TCC solenoid, ECM
P1741	Torque converter clutch (TCC) solenoid – control error	Wiring, TCC solenoid, ECM
P1742	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid, ECM
P1743	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid, ECM
P1744	Torque converter clutch (TCC) – excessive slip detected	Incorrect ATF level, mechanical fault, TCC solenoid, ECM
P1746	Transmission fluid pressure (TFP) control solenoid A – open circuit	Wiring, TFP control solenoid
P1747	Transmission fluid pressure (TFP) control solenoid A short circuit	Wiring, TFP control solenoid
P1748	Transmission fluid pressure (TFP) control solenoid A	Wiring, TFP control solenoid
P1749	Transmission fluid pressure (TFP) control solenoid A failed low	Wiring, TFP control solenoid
P1750	Clutch – adaptive learning not completed	–
P1751	Shift solenoid (SS) A – performance	Mechanical/hydraulic fault, wiring, SS
P1754	Coast clutch solenoid (CCS) valve – circuit malfunction	Wiring, CCS valve
P1756	Shift solenoid (SS) B – performance	Mechanical/hydraulic fault, wiring, SS
P1760	Transmission fluid pressure (TFP) control solenoid A – intermittent short circuit	Wiring, TFP control solenoid
P1761	Shift solenoid (SS) C – performance	Mechanical/hydraulic fault, wiring, SS
P1762	Transmission overdrive band – failed Off	–
P1765	Fuel injection timing solenoid – circuit malfunction	Wiring, fuel injection timing solenoid
P1766	Shift solenoid (SS) D – performance	Mechanical/hydraulic fault, wiring, SS
P1767	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid
P1768	Performance/normal/winter mode input	Wiring, transmission mode selection switch
P1769	Transmission torque modulation fault (AG4 transmission)	–
P1770	Clutch solenoid – circuit malfunction	Wiring, clutch solenoid



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<b>EOBD type</b>	<b>fault location</b>	<b>Probable cause</b>
P1771	Shift solenoid (SS) E – performance	Wiring, SS
P1773	CAN data bus – fuel fired heater malfunction	Wiring, fuel fired heater
P1779	Transmission warning lamp – circuit malfunction	Wiring, transmission warning lamp
P1780	Transmission mode selection switch, O/D Cancel – circuit out of self test range	Wiring, transmission mode selection switch
P1781	Transmission range (TR) switch (4x4L) – out of self test range	Wiring, TR switch
P1782	Transmission mode selection switch, performance/economy – out of self test range	Wiring, transmission mode selection switch
P1783	Transmission over temperature condition	Transmission mechanical fault
P1784	Transmission mechanical failure – first and reverse	Transmission mechanical fault
P1785	Transmission mechanical failure – first and second	Transmission mechanical fault
P1786	Transmission downshift error, 3-2	–
P1787	Transmission downshift error, 2-1	–
P1788	Transmission fluid pressure (TFP) control solenoid B open circuit	Wiring, TFP control solenoid
P1789	Transmission fluid pressure (TFP) control solenoid B short circuit	Wiring, TFP control solenoid
P1792	Barometric pressure (BARO) sensor – circuit malfunction	Wiring, BARO sensor
P1794	Engine control module – supply voltage	Fuses, wiring, battery, alternator
P1795	CAN data bus – level inconsistent	Wiring, ECM
P1800	Transmission clutch interlock safety switch – circuit malfunction	Wiring, transmission clutch interlock safety switch, mechanical fault
P1801	Transmission clutch interlock safety switch – open circuit	Wiring, transmission clutch interlock safety switch
P1802	Transmission clutch interlock safety switch – short circuit to positive	Wiring
P1803	Transmission clutch interlock safety switch – short circuit to earth	Wiring
P1804	Transmission mode selection lamp, 4x4 high – circuit malfunction	Wiring, selection lamp, instruments, ECM
P1805	Transmission mode selection lamp, 4x4 high – open circuit	Wiring, selection lamp, instruments, ECM
P1806	Transmission mode selection lamp, 4x4 high – short circuit to positive	Wiring, selection lamp, instruments, ECM
P1807	Transmission mode selection lamp, 4x4 high – short circuit to earth	Wiring, selection lamp, instruments, ECM
P1808	Transmission mode selection lamp, 4x4 low – circuit malfunction	Wiring, selection lamp, instruments, ECM
P1809	Transmission mode selection lamp, 4x4 low – open circuit	Wiring, selection lamp, instruments, ECM
P1810	Transmission mode selection lamp, 4x4 low – short circuit to positive	Wiring, selection lamp, instruments, ECM
P1811	Transmission mode selection lamp, 4x4 low – indicator short circuit to earth	Wiring, selection lamp, instruments, ECM

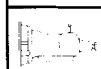


<b>EOBD type</b>	<b>fault location</b>	<b>Probable cause</b>
P1812	Transmission mode selection switch, 4x4 – circuit malfunction	Wiring, transmission mode selection switch, ECM
P1813	Transmission mode selection switch, 4x4 – open circuit	Wiring, transmission mode selection switch, ECM
P1814	Transmission mode selection switch, 4x4 – short circuit to positive	Wiring, transmission mode selection switch, ECM
P1815	Transmission mode selection switch, 4x4 – short circuit to earth	Wiring, transmission mode selection switch, ECM
P1816	Neutral position (NP) switch – circuit malfunction	Wiring, NP switch
P1817	Neutral position (NP) switch – open circuit	Wiring, NP switch
P1818	Neutral position (NP) switch – short circuit to positive	Wiring
P1819	Neutral position (NP) switch – short circuit to earth	Wiring
P1820	Transmission system relay, transfer case clockwise shift – circuit malfunction	Wiring, shift relay
P1821	Transmission system relay, transfer case clockwise shift – open circuit	Wiring, shift relay
P1822	Transmission system relay, transfer case clockwise shift – short circuit to positive	Wiring, shift relay
P1823	Transmission system relay, transfer case clockwise shift – short circuit to earth	Wiring, shift relay
P1824	Transmission system relay, 4x4 clutch – circuit malfunction	Wiring, transmission system relay
P1825	Transmission system relay, 4x4 clutch – open circuit	Wiring, transmission system relay
P1826	Transmission system relay, 4x4 clutch – short circuit to battery	Wiring, transmission system relay
P1827	Transmission system relay, 4x4 low clutch – short circuit to earth	Wiring, transmission system relay
P1828	Transmission system relay, transfer case anticlockwise shift – circuit malfunction	Wiring, transmission system relay
P1829	Transmission system relay, transfer case anticlockwise shift – open circuit	Wiring, transmission system relay
P1830	Transmission system relay, transfer case anticlockwise shift – short circuit to positive	Wiring, transmission system relay
P1831	Transmission system relay, transfer case anticlockwise shift – short circuit to earth	Wiring, transmission system relay
P1832	Differential lock actuator, transfer case – circuit malfunction	Wiring, differential lock actuator
P1833	Differential lock actuator, transfer case – open circuit	Wiring, differential lock actuator
P1834	Differential lock actuator, transfer case – short circuit to positive	Wiring, differential lock actuator
P1835	Differential lock actuator, transfer case – short circuit to earth	Wiring, differential lock actuator
P1836	Transfer case front shaft speed sensor – circuit malfunction	Wiring, speed sensor
P1837	Transfer case rear shaft speed sensor – circuit malfunction	Wiring, speed sensor
P1838	Transfer case shift motor – circuit malfunction	Wiring, transfer case shift motor
P1839	Transfer case shift motor – open circuit	Wiring, transfer case shift motor



**MAZDA**

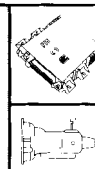
Model: Mazda2 • Mazda6 • Tribute



Engine management/transmission

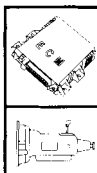
EOBD type	fault location	Probable cause
P1840	Transfer case shift motor – short circuit to positive	Wiring, transfer case shift motor
P1841	Transfer case shift motor – short circuit to earth	Wiring, transfer case shift motor
P1842	Differential lock switch, feedback – transfer case – circuit malfunction	Wiring, differential lock switch
P1843	Differential lock switch, feedback – transfer case – open circuit	Wiring, differential lock switch
P1844	Differential lock switch, feedback – transfer case – short circuit to positive	Wiring, differential lock switch
P1845	Differential lock switch, feedback – transfer case – short circuit to earth	Wiring, differential lock switch
P1846	Transfer case contact plate A circuit malfunction	Wiring, transfer case contact plate
P1847	Transfer case contact plate A open circuit	Wiring, transfer case contact plate
P1848	Transfer case contact plate A short circuit to positive	Wiring, transfer case contact plate
P1849	Transfer case contact plate A short circuit to earth	Wiring, transfer case contact plate
P1850	Transfer case contact plate B circuit malfunction	Wiring, transfer case contact plate
P1851	Transfer case contact plate B open circuit	Wiring, transfer case contact plate
P1852	Transfer case contact plate B short circuit to positive	Wiring, transfer case contact plate
P1853	Transfer case contact plate B short circuit to earth	Wiring, transfer case contact plate
P1854	Transfer case contact plate C circuit malfunction	Wiring, transfer case contact plate
P1855	Transfer case contact plate C open circuit	Wiring, transfer case contact plate
P1856	Transfer case contact plate C short circuit to positive	Wiring, transfer case contact plate
P1857	Transfer case contact plate C short circuit to earth	Wiring, transfer case contact plate
P1858	Transfer case contact plate D circuit malfunction	Wiring, transfer case contact plate
P1859	Transfer case contact plate D open circuit	Wiring, transfer case contact plate
P1860	Transfer case contact plate D short circuit to positive	Wiring, transfer case contact plate
P1861	Transfer case contact plate D short circuit to earth	Wiring, transfer case contact plate
P1862	Transfer case contact plate – circuit malfunction	Wiring, transfer case contact plate
P1863	Transfer case contact plate – open circuit	Wiring, transfer case contact plate
P1864	Transfer case contact plate – short circuit to battery	Wiring, transfer case contact plate
P1865	Transfer case contact plate – short circuit to earth	Wiring, transfer case contact plate
P1866	Transfer case system concern – servicing required	–
P1867	Transfer case contact plate – circuit malfunction	Wiring, transfer case contact plate
P1868	Transmission mode selection lamp, 4x4 – circuit malfunction	Wiring, selection lamp, instruments, ECM
P1869	Transmission mode selection lamp, 4x4 – short circuit to positive	Wiring, selection lamp, instruments, ECM
P1870	Transmission mode selection switch, mechanical transfer case 4x4 – circuit malfunction	Wiring, transmission mode selection switch
P1871	Transmission mode selection switch, mechanical transfer case 4x4 – short circuit to positive	Wiring, transmission mode selection switch
P1872	Transmission mode selection lamp, axle lock – mechanical 4x4 – circuit malfunction	Wiring, transmission mode selection lamp
P1873	Transmission mode selection lamp, axle lock – mechanical 4x4 – short circuit to positive	Wiring, transmission mode selection lamp





<b>EODB type</b>	<b>fault location</b>	<b>Probable cause</b>
P1874	Transfer case hall effect sensor – circuit malfunction	Wiring, hall effect sensor
P1875	Transfer case hall effect sensor – short circuit to positive	Wiring, hall effect sensor
P1876	Transmission mode control solenoid, transfer case 2x4 – circuit malfunction	Wiring, transmission mode control solenoid
P1877	Transmission mode control solenoid, transfer case 2x4 – short circuit to positive	Wiring, transmission mode control solenoid
P1878	Transmission mode control solenoid, transfer case disengaged – circuit malfunction	Wiring, transmission mode control solenoid
P1879	Transmission mode control solenoid, transfer case disengaged – open circuit	Wiring, transmission mode control solenoid
P1880	Transmission mode control solenoid, transfer case disengaged – short circuit to positive	Wiring, transmission mode control solenoid
P1881	Engine coolant 'low' warning lamp switch – circuit malfunction	Wiring, engine coolant 'low' warning lamp switch
P1882	Engine coolant 'low' warning lamp switch – short circuit to earth	Wiring, engine coolant 'low' warning lamp switch
P1883	Engine coolant 'low' warning lamp switch – circuit malfunction	Wiring, engine coolant 'low' warning lamp switch
P1884	Engine coolant 'low' warning lamp switch – short circuit to earth	Wiring, engine coolant 'low' warning lamp switch
P1885	Transmission mode control solenoid, transfer case disengaged – short circuit to earth	Wiring, transmission mode control solenoid
P1886	Transmission – 4X4 initialization failure	–
P1889	Oil pressure pump – performance	–
P1890	Transmission 4x4 mode select, return – circuit malfunction	–
P1891	Transfer case contact plate – open circuit	Wiring, transfer case contact plate
P1892	Axle disconnect engagement solenoid – voltage high	Wiring, axle disconnect engagement solenoid
P1893	Axle disconnect engagement solenoid – voltage low	Wiring, axle disconnect engagement solenoid
P1894	Axle disconnect disengagement solenoid – voltage high	Wiring, axle disconnect disengagement solenoid
P1895	Axle disconnect disengagement solenoid – voltage low	Wiring, axle disconnect disengagement solenoid
P1896	Axle disconnect engagement position sensor – voltage high	Wiring, axle disconnect engagement position sensor
P1897	Axle disconnect engagement position sensor – voltage low	Wiring, axle disconnect engagement position sensor
P1898	Transmission mode selection lamp, axle disconnect – voltage high	Wiring, selection lamp
P1899	Transmission mode selection lamp, axle disconnect – voltage low	Wiring, selection lamp
P1900	Transmission output shaft speed sensor – circuit intermittent	Wiring, transmission output shaft speed sensor
P1901	Transmission turbine shaft speed (TSS) sensor – circuit intermittent	Wiring, TSS sensor
P1902	Transmission kick-down relay – control circuit malfunction	Wiring, transmission kick-down relay
P1903	Transmission kick-down relay – voltage low	Wiring, transmission kick-down relay



**MAZDA**

Model: Mazda2 • Mazda6 • Tribute

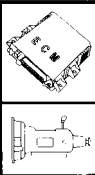
**Engine management/transmission**

<b>EOBD type</b>	<b>fault location</b>	<b>Probable cause</b>
P1904	Transmission kick-down relay – voltage high	Wiring, transmission kick-down relay
P1905	Control module configured for end of line test mode	–
P1906	Kick-down relay (A4LD transmission) – pull on, open/short circuit	Wiring, kick-down relay
P1907	Kick-down relay (A4LD transmission) – hold, open/short circuit	Wiring, kick-down relay
P1908	Transmission fluid pressure (TFP) solenoid (A4LD transmission) – open/short circuit	Wiring, TFP solenoid
P1909	Transmission fluid temperature (TFT) sensor (A4LD transmission) – open/short circuit	Wiring, TFT sensor
P1910	Reversing lamp, control – open circuit	Wiring, reversing lamp switch
P1911	Reversing lamp, control – voltage low	Wiring, reversing lamp switch
P1912	Reversing lamp, control – voltage high	Wiring, reversing lamp switch
P1913	Sensor earth, A – open circuit	Wiring, ECM
P1914	Sensor earth, A – voltage low	Wiring, ECM
P1915	Sensor earth, A – voltage high	Wiring, ECM
P1916	Sensor earth, B – open circuit	Wiring, ECM
P1917	Sensor earth, B – voltage low	Wiring, ECM
P1918	Sensor earth, B – voltage high	Wiring, ECM
P1919	Engine coolant temperature signal, TCM	Wiring, ECT sensor
P1920	Engine speed signal, TCM	Wiring
P1921	Transmission range (TR) signal	Wiring, TR sensor/switch
P1933	Fuel level signal	Wiring, fuel gauge tank sensor
P1934	Vehicle speed signal	Wiring, VSS
P1935	Brake switch/sensor signal	Wiring, BPP switch/sensor
P1936	Clutch switch/sensor signal	Wiring, CPP switch/sensor
P1937	Fuel fired heater, control – open circuit	Wiring
P1938	Fuel fired heater, control – voltage low	Wiring
P1939	Fuel fired heater, control – voltage high	Wiring
U1021	Communication link – invalid/missing for AC clutch input	–
U1039	Communication link – invalid/missing for vehicle speed	–
U1041	Communication link – invalid/missing for vehicle speed	–
U1051	Communication link – invalid/missing for brake input	–
U1073	Communication link – invalid/missing for engine coolant fan status	–
U1075	Communication link – invalid/missing for engine oil temperature (EOT)	–
U1089	Communication link – invalid/missing for suspension	–
U1098	Communication link – invalid/missing for cruise control	–
U1130	Communication link – invalid/missing for fuel system	–
U1131	Communication link – invalid/missing for fuel pump (FP) status	–



<b>EOBD type</b>	<b>fault location</b>	<b>Probable cause</b>
U1135	Communication link – invalid/missing for ignition switch/ starter	–
U1147	Communication link – invalid/missing for vehicle security	–
U1243	Communication link – invalid/missing for exterior environment	–
U1262	Communication link – bus fault	–
U1341	Communication link – invalid/missing for function read vehicle speed	–
U1451	Communication link – invalid/missing data from immobilizer control module, vehicle immobilized	<b>Wiring, immobilizer control module</b>
U1900	Controller area network (CAN) – bus fault	<b>Wiring</b>
U2023	Fault received from external node	–
U2050	No application present	–
U2051	One or more calibration files missing/corrupt	–
U2064	Warning lamp requested by another control module	–
U2195	Communication link – invalid data from steering column switches	<b>Wiring, steering column switches</b>
U2510	CAN data bus – malfunction	<b>Wiring</b>





# MAZDA

323 (BG) • 323 Estate 1,6/4x4 (BW) • 323 (BA) • 323 1,3/1,5/1,8 (BJ) • 323 2,0 D/TD (BJ)  
626/MX-6 (GE) • 626/Estate 1,8/2,0 (GF/GW) • 626/Estate 2,0 TD (GF/GW) • Xedos 6/9  
MX-3/MX-5

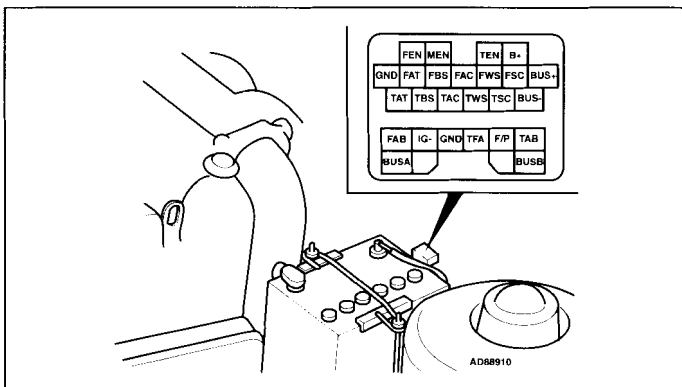
Year: 1989-03

Engine code: BP, BP-DOHC, B3, B3E, B6, B6-SOHC, B6-DOHC, B6E, FP, FS, KF, KJ, KL K8, RF, RF-CX, RF-Turbo, ZL, Z5

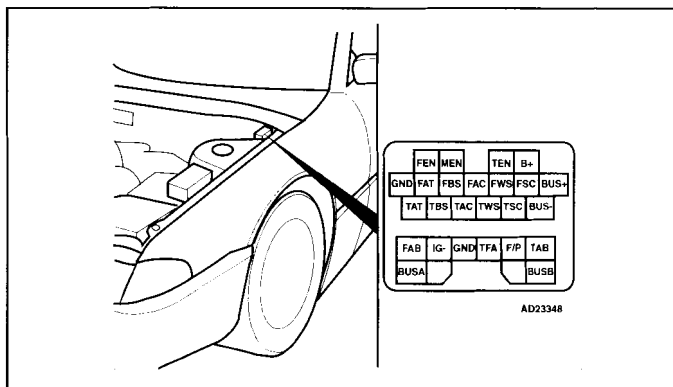
System: Mazda EGI • Mazda EDC

Engine management/transmission

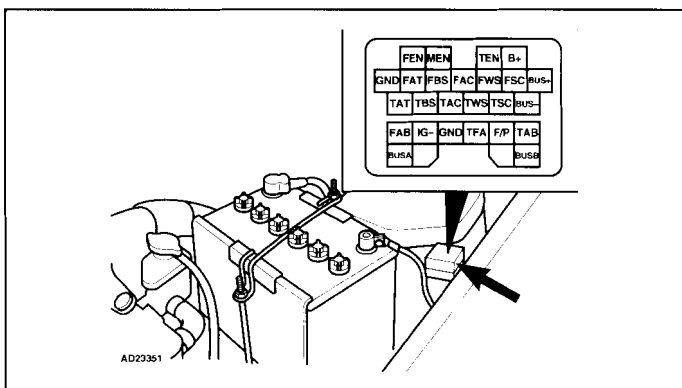
## Data link connector (DLC) locations



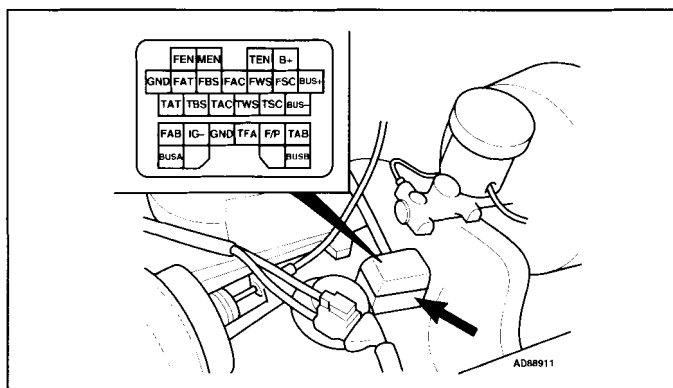
323 – engine bay, LH



626/Estate 1998 → – engine bay, LH



626 → 1997/MX-6, Xedos 6/9, MX-3 – engine bay, LH



MX-5 – near brake master cylinder

## Trouble codes

### General information

#### Except Xedos 9 2,3

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- Except 323 1998 →, 626/Estate/MX-5 1997 →: Engine control module (ECM) displays all available diagnostic information for immobilizer system.

- DLC without wiring/terminals in positions FAT & TAT: Engine control module (ECM) incorporates transmission control function.
- DLC with wiring/terminals in positions FAT & TAT: Transmission control module (TCM) mounted separately.
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).

#### Xedos 9 2,3

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to the data link connector (DLC).



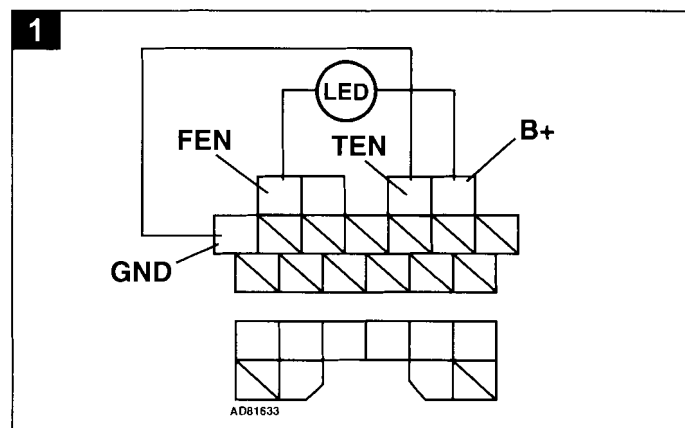
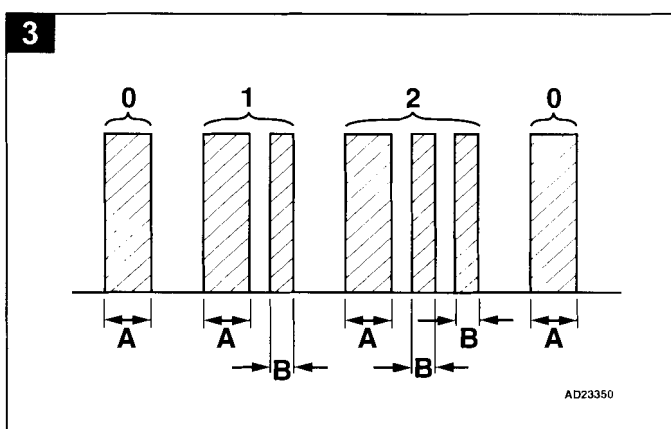
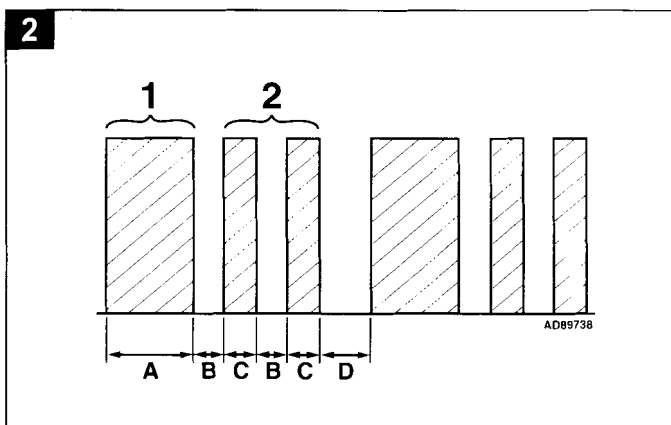
- Engine control module (ECM) displays all available diagnostic information for immobilizer system.
- Transmission control module (TCM) mounted separately.
- Data bus connecting ECM to TCM allows faults relating to both systems to be displayed when accessing ECM fault memory.
- The ECM/TCM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).

### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals GND and TEN **1**.
- Connect LED test lamp between terminals FEN and B+ **1**.

**NOTE:** Connect LED test lamp positive connection to DLC terminal B+.

- Switch ignition ON.
- Count LED flashes. Note trouble codes. Compare with trouble code table.
- Two digit trouble codes are displayed as follows:
  - Long flashes indicate the 'tens' **2** [A].
  - Short flashes indicate the 'units' **2** [C].
  - For example: Trouble code 12 displayed **2**.
- Four digit trouble codes are displayed as follows:
  - Each trouble code consists of four groups.
  - A long flash indicates the start of each group **3** [A].
  - Short flashes indicate the digits of each group **3** [B].
  - No short flashes in a group indicate '0'.
  - For example: Trouble code 0120 displayed **3**.
- Switch ignition OFF. Rectify faults as necessary.





### Erasing

- Ensure ignition switched OFF.
- Disconnect battery earth lead for at least 30 seconds.
- Depress brake pedal for at least 20 seconds.
- Reconnect battery earth lead.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).

### Trouble code identification

Flash type	Fault location	Probable cause
01	Ignition pulse missing	Wiring, tachometer, ignition coil, distributor, ECM, TCM
02	Diesel: Engine speed (RPM) sensor – no signal	Wiring, RPM sensor
02 <b>1</b>	Petrol: Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal	Wiring, sensor supply voltage, CKP/RPM sensor
03	Camshaft position (CMP) sensor – no signal	Wiring, sensor supply voltage, CMP sensor

	<b>MAZDA</b> Model: 323 (BG) • 323 Estate 1,6/4x4 (BW) • 323 (BA) • 323 1,3/1,5/1,8 (BJ) • 323 2,0 D/TD (BJ) • 626/MX-6 (GE) 626/Estate 1,8/2,0 (GF/GW) • 626/Estate 2,0 TD (GF/GW) • Xedos 6/9 • MX-3/MX-5
	<b>Engine management/transmission</b>

Flash type	Fault location	Probable cause
04	Diesel: Crankshaft position (CKP) sensor – no signal	Wiring, sensor supply voltage, CKP sensor
04 	Petrol: Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal	Wiring, sensor supply voltage, CKP/RPM sensor
05	Knock sensor (KS)	Wiring, KS
06	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
08	Mass air flow (MAF) sensor/volume air flow (VAF) sensor	Wiring, MAF/VAF sensor
09	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
10	Intake air temperature (IAT) sensor	Wiring, IAT sensor
11	Intake air temperature (IAT) sensor	Wiring, IAT sensor
12	Throttle position (TP) sensor	Wiring, TP sensor adjustment, TP sensor
14	Barometric pressure (BARO) sensor	Wiring, BARO sensor, ECM
15	Except V6: Oxygen sensor (O2S)/heated oxygen sensor (HO2S) – no activity	Intake leak, fuel pressure/pump, wiring, O2S/HO2S, injector(s), ECT sensor, MAF sensor, spark plugs
	V6: Heated oxygen sensor (HO2S), bank 2 – no activity	Intake leak, fuel pressure/pump, wiring, O2S/HO2S, injector(s), ECT sensor, MAF sensor, spark plugs
16	Exhaust gas recirculation (EGR) valve position sensor	Wiring, EGR valve position sensor
17	Except V6: Oxygen sensor (O2S)/heated oxygen sensor (HO2S) – incorrect signal	Intake leak, fuel pressure/pump, wiring, O2S/HO2S, injector(s), ECT sensor, MAF sensor, spark plugs
	V6: Heated oxygen sensor (HO2S), bank 2 – incorrect signal	Intake leak, fuel pressure/pump, wiring, O2S/HO2S, injector(s), ECT sensor, MAF sensor, spark plugs
18	Fuel quantity adjuster	Wiring, fuel quantity adjuster/position sensor
19	Fuel quantity adjuster position sensor	Wiring, fuel quantity adjuster position sensor
22	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid
23	Diesel: Fuel temperature sensor	Wiring, fuel temperature sensor
	Petrol: Heated oxygen sensor (HO2S), bank 1 – no activity	Intake leak, wiring, O2S/HO2S, injector(s), ECT sensor, MAF sensor, spark plugs
24	Heated oxygen sensor (HO2S), bank 1 – incorrect signal	Intake leak, fuel pressure/pump, wiring, O2S/HO2S, injector(s), ECT sensor, MAF sensor, spark plugs
25	Fuel pressure regulator control solenoid	Wiring, fuel pressure regulator control solenoid
26	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve
28	Exhaust gas recirculation (EGR) solenoid – vacuum	Wiring, EGR solenoid
29	Exhaust gas recirculation (EGR) solenoid – vent	Wiring, EGR solenoid
34	Idle air control (IAC) valve	Wiring, IAC valve
35	Fuel pressure regulator control solenoid 2	Wiring, fuel pressure regulator control solenoid
36	Glow plug relay	Wiring, glow plug relay
41	Intake manifold air control solenoid 1	Wiring, intake manifold air control solenoid
43	Fuel injection timing sensor	Wiring, fuel injection timing sensor/solenoid
46	Petrol: Intake manifold air control solenoid 2	Wiring, intake manifold air control solenoid
	Diesel: Closed throttle position (CTP) switch	Wiring, CTP switch
49	Engine control module (ECM) – defective	ECM
52	Module coding plug	Wiring, module coding plug



Flash type	Fault location	Probable cause
55	Input shaft speed (ISS) sensor/turbine shaft speed (TSS) sensor	Wiring, ISS/TSS sensor
56	323: Engine control module (ECM) – supply voltage	Wiring, ECM
	626: Transmission fluid temperature (TFT) sensor	Wiring, TFT sensor
57	Engine control relay	Wiring, engine control relay
60	Shift solenoid (SS) A, 1-2	Wiring, SS
61	Shift solenoid (SS) B, 2-3	Wiring, SS
62	Shift solenoid (SS) C, 3-4	Wiring, SS
63	Torque converter clutch (TCC) control solenoid	Wiring, TCC control solenoid
64	Shift timing solenoid, 3-2	Wiring, shift timing solenoid
65	Torque converter clutch (TCC) solenoid	Wiring, TCC solenoid
66	Transmission fluid pressure (TFP) solenoid	Wiring, TFP solenoid
67	Engine coolant blower motor relay – low temperature	Wiring, engine coolant blower motor relay
68	Engine coolant blower motor relay – high temperature	Wiring, engine coolant blower motor relay
69	Engine coolant blower motor temperature sensor	Wiring, engine coolant blower motor temperature sensor
71	Engine control module (ECM)/immobilizer control module – communication error	Wiring, immobilizer control module, ECM
72	Ignition key – not programmed into ECM	ECM incorrectly programmed/not programmed
73	Engine control module (ECM)/immobilizer control module – immobilizer codes do not match	Incorrectly programmed immobilizer control module/ECM
74	Engine control module (ECM)/immobilizer control module – ignition key codes not match	Incorrect/damaged key, ECM incorrectly programmed
75	Engine control module (ECM) – EEPROM error	ECM
76	Engine control module (ECM) – immobilizer code not stored	ECM incorrectly/not programmed
77	Immobilizer control module – communication error	Incorrect/damaged key, wiring, reader coil, immobilizer control module

1 626/Xedos 6/9, engine codes KF/KL: Located in cylinder block.

2 626/Xedos 6/9, engine codes KF/KL: Located in distributor.

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1100	Mass air flow (MAF) sensor – circuit intermittent	Wiring, MAF sensor
P1101	Mass air flow (MAF) sensor – circuit intermittent	Wiring, MAF sensor
P1110	Intake air temperature (IAT) sensor 2	Wiring, IAT sensor
P1112	Intake air temperature (IAT) sensor – circuit intermittent	Wiring, IAT sensor
P1113	Intake air temperature (IAT) sensor 2	Wiring, IAT sensor

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Model: 323 (BG) • 323 Estate 1,6/4x4 (BW) • 323 (BA) • 323 1,3/1,5/1,8 (BJ) • 323 2,0 D/TD (BJ) • 626/MX-6 (GE) 626/Estate 1,8/2,0 (GF/GW) • 626/Estate 2,0 TD (GF/GW) • Xedos 6/9 • MX-3/MX-5

**Engine management/transmission**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1117	Engine coolant temperature (ECT) sensor – circuit intermittent	Wiring, ECT sensor
P1120	Throttle position (TP) sensor – low input	Wiring short to earth, TP sensor
P1125	Throttle position (TP) sensor – circuit intermittent	Wiring, TP sensor
P1130	Fuel trim (FT) – control limit exceeded	Intake/exhaust leak, fuel pressure/pump, EVAP/EGR system, wiring, HO2S
P1131	Heated oxygen sensor (HO2S) – low voltage	Intake/exhaust leak, fuel pressure low, hose connection, HO2S/wiring short to earth, injector(s), MAF sensor/wiring
P1132	Heated oxygen sensor (HO2S) – high voltage	Intake/exhaust blockage, fuel pressure high, EVAP/EGR system, HO2S/wiring short to positive, injector(s), MAF sensor
P1170	Oxygen sensor (O2S)/heated oxygen sensor (HO2S), bank 1 – incorrect signal	Intake leak, fuel pressure/pump, wiring, O2S/HO2S, injector(s), ECT sensor, MAF sensor, spark plugs
P1173	Oxygen sensor (O2S)/heated oxygen sensor (HO2S), bank 2 – incorrect signal	Intake leak, fuel pressure/pump, wiring, O2S/HO2S, injector(s), ECT sensor, MAF sensor, spark plugs
P1182	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid
P1189	Fuel injection pump position/speed sensor	Wiring, fuel injection pump speed sensor
P1190	Module coding plug	Wiring, module coding plug
P1195	Barometric pressure (BARO) sensor	Wiring, BARO sensor, ECM
P1196	Ignition switch, start signal – circuit malfunction	Wiring, starter motor
P1221	Traction control system (TCS) – malfunction	Wiring, TCS malfunction
P1226	Fuel quantity adjuster position sensor – circuit malfunction	Wiring, fuel quantity adjuster position sensor
P1250	Fuel pressure regulator control solenoid	Wiring, fuel pressure regulator control solenoid
P1252	Fuel pressure regulator control solenoid 2	Wiring, fuel pressure regulator control solenoid
P1279	Fuel quantity adjuster position sensor – range/performance problem	Wiring, fuel quantity adjuster position sensor
P1298	Fuel quantity adjuster control module – circuit malfunction	Wiring, fuel quantity adjuster control module
P1312	Fuel injection timing valve	Wiring, fuel injection timing valve
P1318	Fuel injection timing valve position sensor – circuit malfunction	Wiring, fuel injection timing valve position sensor
P1319	Fuel injection timing valve position sensor – range/performance problem	Wiring, fuel injection timing valve position sensor
P1345	Camshaft position (CMP) sensor – no signal	Wiring, sensor supply voltage, CMP sensor
P1402	Exhaust gas recirculation (EGR) valve position sensor	Wiring, EGR valve position sensor
P1409	Exhaust gas recirculation (EGR) valve – circuit malfunction	Wiring, EGR valve
P1474	Engine coolant blower motor relay – circuit malfunction	Wiring, engine coolant blower motor relay
P1485	Exhaust gas recirculation (EGR) solenoid – vacuum	Wiring, EGR solenoid
P1486	Exhaust gas recirculation (EGR) solenoid – vent	Wiring, EGR solenoid





Engine management/transmission

EOBD type	Fault location	Probable cause
P1487	Manifold absolute pressure (MAP) sensor solenoid	Wiring, MAP sensor solenoid
P1496	Exhaust gas recirculation (EGR) valve, motor coil 1	Wiring, EGR valve
P1497	Exhaust gas recirculation (EGR) valve, motor coil 2	Wiring, EGR valve
P1498	Exhaust gas recirculation (EGR) valve, motor coil 3	Wiring, EGR valve
P1499	Exhaust gas recirculation (EGR) valve, motor coil 4	Wiring, EGR valve
P1500	Vehicle speed sensor (VSS) – intermittent signal	Wiring, VSS
P1504	Idle air control (IAC) valve	Wiring, IAC valve
P1508	Bypass solenoid 1	Wiring, bypass solenoid
P1509	Bypass solenoid 2	Wiring, bypass solenoid
P1521	Intake manifold air control solenoid 1	Wiring, intake manifold air control solenoid
P1522	Intake manifold air control solenoid 2	Wiring, intake manifold air control solenoid
P1523	Intake manifold air control solenoid 1	Wiring, intake manifold air control solenoid
P1524	Intercooler bypass solenoid	Wiring, intercooler bypass solenoid
P1525	Air bypass valve solenoid – vacuum	Wiring, air bypass valve solenoid
P1526	Air bypass valve solenoid – vent	Wiring, air bypass valve solenoid
P1540	Air bypass valve control	Hose leak/blockage, wiring, air bypass valve actuator/solenoid
P1562	Engine control module (ECM) – supply voltage low	Battery, alternator, wiring
P1601	Data bus, TCM	Wiring, ECM, TCM
P1602	Engine control module (ECM)/immobilizer control module – communication error	Wiring, reader coil, ignition key, immobilizer control module, ECM
P1603	Ignition key – not programmed into ECM	ECM incorrectly/not programmed
P1604	Engine control module (ECM) – immobilizer code not stored	ECM incorrectly/not programmed
P1606	Engine control relay	Wiring, engine control relay
P1608	Engine control module (ECM)	ECM
P1609	Engine control module (ECM) – knock control	ECM
P1621	Engine control module (ECM)/immobilizer control module – immobilizer codes do not match	Incorrectly programmed immobilizer control module/ECM
P1622	Engine control module (ECM)/immobilizer control module – ignition key codes not match	Incorrect/damaged key, ECM incorrectly programmed
P1623	Engine control module (ECM) – EEPROM error	ECM
P1624	Engine control module (ECM) – immobilizer deactivation signal missing	Battery disconnected – erase trouble code, immobilizer system malfunction
P1627	ECM/ABS electrical connection – communication error	Wiring, ABS control module, ECM
P1631	Alternator – output voltage low	Wiring, alternator drive belt, alternator

**MAZDA**

Model: 323 (BG) • 323 Estate 1,6/4x4 (BW) • 323 (BA) • 323 1,3/1,5/1,8 (BJ) • 323 2,0 D/TD (BJ) • 626/MX-6 (GE) 626/Estate 1,8/2,0 (GF/GW) • 626/Estate 2,0 TD (GF/GW) • Xedos 6/9 • MX-3/MX-5

**Engine management/transmission**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
<b>P1632</b>	Engine control module (ECM) – supply voltage low	<b>Wiring, alternator, battery</b>
<b>P1633</b>	Engine control module (ECM) – supply voltage high	<b>Wiring, voltage surge when battery disconnected, alternator</b>
<b>P1634</b>	Alternator – output voltage high/ battery voltage low	<b>Wiring, alternator, battery</b>
<b>P1649</b>	Engine control module (ECM) – defective	<b>ECM</b>
<b>P1650</b>	Power steering pressure (PSP) switch	<b>Wiring, PSP switch</b>
<b>P1720</b>	Vehicle speed sensor (VSS)	<b>Wiring, speedometer, VSS</b>
<b>P1743</b>	Torque converter clutch (TCC) solenoid	<b>Wiring, TCC control solenoid</b>
<b>P1744</b>	Torque converter clutch (TCC) solenoid	<b>Wiring, TCC solenoid</b>
<b>P1765</b>	Shift timing solenoid, 3-2	<b>Wiring, shift timing solenoid</b>
<b>P1770</b>	Overrunning clutch solenoid	<b>Wiring, overrunning clutch solenoid</b>
<b>P1790</b>	Throttle position (TP) sensor	<b>Wiring, TP sensor</b>



Model: 323 1,3/1,6/1,8/2,0 (BJ)  
626/Estate 1,8/2,0 (GF/GW) • MX-5 1,6/1,8

Year: 2000-04

Engine code: BP, B3, B6, FP, FS, ZM

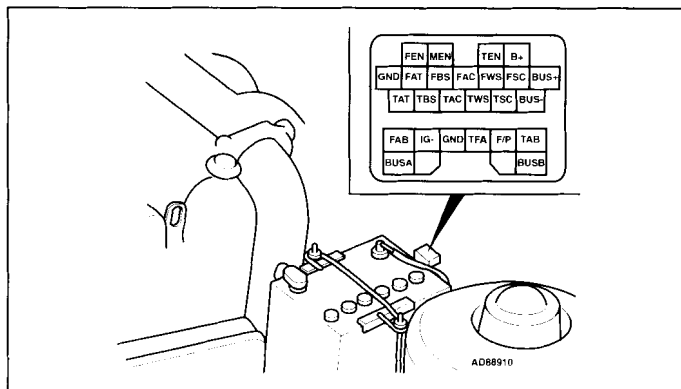
System: Mazda EGI

**MAZDA**

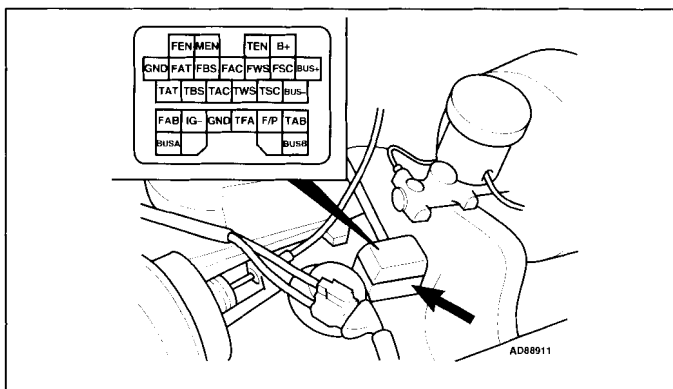


## Engine management/transmission

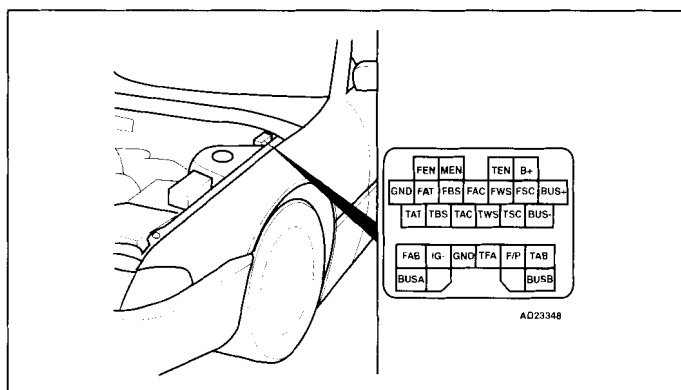
### Data link connector (DLC) locations



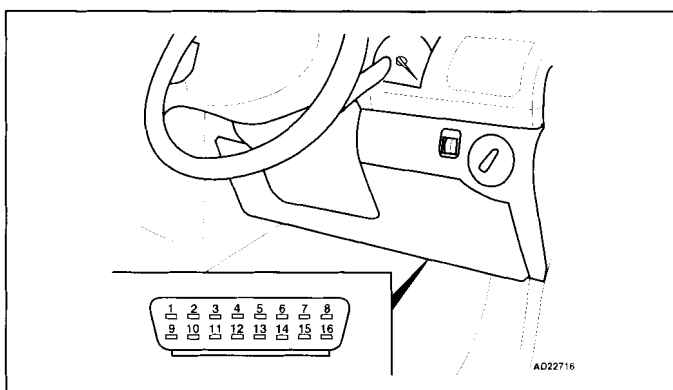
DLC 1 – 323 – engine bay, LH



DLC 1 – MX-5 – near brake master cylinder



DLC 1 – 626/Estate – engine bay, LH



DLC 2 – fascia

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- 323/626: Engine control module (ECM) incorporates transmission control module (TCM) function.
- MX-5: Transmission control module (TCM) mounted separately.
- MX-5: Data bus connecting ECM to TCM allows faults relating to both systems to be displayed when accessing ECM fault memory.

#### Accessing and erasing

- 323/626: The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).
- MX-5: The ECM/TCM fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**MAZDA**Model: 323 1,3/1,6/1,8/2,0 (BJ) • 626/Estate 1,8/2,0 (GF/GW)  
MX-5 1,6/1,8

Engine management/transmission

**Trouble code identification**

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1100	Mass air flow (MAF) sensor – circuit intermittent	Wiring, MAF sensor
P1101	Mass air flow (MAF) sensor – circuit intermittent	Wiring, MAF sensor
P1102	Mass air flow (MAF) sensor/throttle position (TP) sensor – signal incompatibility, lower than expected	Wiring, poor connection, MAF sensor, TP sensor
P1103	Mass air flow (MAF) sensor/throttle position (TP) sensor – signal incompatibility, higher than expected	Wiring, poor connection, MAF sensor, TP sensor
P1110	Intake air temperature (IAT) sensor 2	Wiring, IAT sensor
P1112	Intake air temperature (IAT) sensor – circuit intermittent	Wiring, IAT sensor
P1113	Intake air temperature (IAT) sensor 2	Wiring, IAT sensor
P1117	Engine coolant temperature (ECT) sensor – circuit intermittent	Wiring, ECT sensor
P1120	Throttle position (TP) sensor – low input	Wiring short to earth, TP sensor
P1122	Throttle position (TP) sensor – signal low	Wiring open circuit/short to earth, poor connection, TP sensor, ECM
P1123	Throttle position (TP) sensor – signal high	Wiring short to positive, TP sensor, ECM
P1123	Throttle position (TP) sensor – stuck open	Wiring, TP sensor, ECM
P1125	Throttle position (TP) sensor – circuit intermittent	Wiring, TP sensor
P1130	Fuel trim (FT) – control limit exceeded	Intake/exhaust leak, fuel pressure/pump, EVAP/EGR system, wiring, HO2S
P1131	Heated oxygen sensor (HO2S) – low voltage	Intake/exhaust leak, fuel pressure low, hose connection, HO2S/wiring short to earth, injector(s), MAF sensor/wiring
P1132	Heated oxygen sensor (HO2S) – high voltage	Intake/exhaust blockage, fuel pressure high, EVAP/EGR system, HO2S/wiring short to positive, injector(s), MAF sensor
P1170	Heated oxygen sensor (HO2S) – incorrect signal	Intake leak, fuel pressure/pump, wiring, O2S/HO2S, injector(s), EVAP canister purge valve, ignition coil, low compression
P1173	Oxygen sensor (O2S)/heated oxygen sensor (HO2S), bank 2 – incorrect signal	Intake leak, fuel pressure/pump, wiring, O2S/HO2S, injector(s), ECT sensor, MAF sensor, spark plugs
P1182	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid
P1189	Fuel injection pump position/speed sensor	Wiring, fuel injection pump speed sensor
P1190	Module coding plug	Wiring, module coding plug
P1195	Barometric pressure (BARO) sensor	Wiring, BARO sensor, ECM
P1196	Ignition switch, start signal – circuit malfunction	Wiring, starter motor
P1221	Traction control system (TCS) – malfunction	Wiring, TCS malfunction
P1226	Fuel quantity adjuster position sensor – circuit malfunction	Wiring, fuel quantity adjuster position sensor
P1250	Fuel pressure regulator control solenoid – circuit malfunction	Wiring, fuel pressure regulator control solenoid
P1252	Fuel pressure regulator control solenoid 2	Wiring, fuel pressure regulator control solenoid
P1279	Fuel quantity adjuster position sensor – range/performance problem	Wiring, fuel quantity adjuster position sensor
P1298	Fuel quantity adjuster control module – circuit malfunction	Wiring, fuel quantity adjuster control module



Engine management/transmission

EOBD type	Fault location	Probable cause
P1312	Fuel injection timing valve	Wiring, fuel injection timing valve
P1318	Fuel injection timing valve position sensor – circuit malfunction	Wiring, fuel injection timing valve position sensor
P1319	Fuel injection timing valve position sensor – range/performance problem	Wiring, fuel injection timing valve position sensor
P1345	Camshaft position (CMP) sensor – no signal	Wiring, sensor supply voltage, CMP sensor
P1402	Exhaust gas recirculation (EGR) valve position sensor	Wiring, EGR valve position sensor
P1409	Exhaust gas recirculation (EGR) valve – circuit malfunction	Wiring, EGR valve
P1474	Engine coolant blower motor relay – circuit malfunction	Wiring, engine coolant blower motor relay
P1485	Exhaust gas recirculation (EGR) solenoid – vacuum	Wiring, EGR solenoid
P1486	Exhaust gas recirculation (EGR) solenoid – vent	Wiring, EGR solenoid
P1487	Manifold absolute pressure (MAP) sensor solenoid	Wiring, MAP sensor solenoid
P1496	Exhaust gas recirculation (EGR) valve, motor coil 1	Wiring, EGR valve
P1497	Exhaust gas recirculation (EGR) valve, motor coil 2	Wiring, EGR valve
P1498	Exhaust gas recirculation (EGR) valve, motor coil 3	Wiring, EGR valve
P1499	Exhaust gas recirculation (EGR) valve, motor coil 4	Wiring, EGR valve
P1500	Vehicle speed sensor (VSS) – intermittent signal	Wiring, VSS
P1504	Idle air control (IAC) valve – circuit malfunction	Wiring, IAC valve, ECM
P1508	Bypass solenoid 1	Wiring, bypass solenoid
P1509	Bypass solenoid 2	Wiring, bypass solenoid
P1512	Intake manifold air control solenoid – stuck closed	Wiring short circuit, intake manifold air control solenoid, IAT sensor, BARO sensor, CKP sensor, MAF sensor, mechanical fault, ECM
P1521	Intake manifold air control solenoid 1	Wiring, intake manifold air control solenoid
P1522	Intake manifold air control solenoid 2	Wiring, intake manifold air control solenoid
P1523	Intake manifold air control solenoid 1	Wiring, intake manifold air control solenoid
P1524	Intercooler bypass solenoid	Wiring, intercooler bypass solenoid
P1525	Air bypass valve solenoid – vacuum	Wiring, air bypass valve solenoid
P1526	Air bypass valve solenoid – vent	Wiring, air bypass valve solenoid
P1540	Air bypass valve control	Hose leak/blockage, wiring, air bypass valve actuator/solenoid
P1562	Engine control module (ECM) – supply voltage low	Fuse, wiring open circuit/short to earth, poor connection, battery, alternator
P1569	Intake manifold air control solenoid – low input	Wiring open circuit/short to earth, poor connection, intake manifold air control solenoid, ECM
P1570	Intake manifold air control solenoid – high input	Wiring open circuit/short to positive, poor connection, intake manifold air control solenoid, ECM
P1601	Data bus, TCM	Wiring, ECM, TCM
P1602	Engine control module (ECM)/immobilizer control module – communication error	Wiring, reader coil, ignition key, immobilizer control module, ECM
P1603	Ignition key – not programmed into ECM	ECM incorrectly/not programmed
P1604	Engine control module (ECM) – immobilizer code not stored	ECM incorrectly/not programmed



**MAZDA**Model: 323 1,3/1,6/1,8/2,0 (BJ) • 626/Estate 1,8/2,0 (GF/GW)  
MX-5 1,6/1,8**Engine management/transmission**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1606	Engine control relay	Wiring, engine control relay
P1608	Engine control module (ECM)	ECM
P1609	Engine control module (ECM) – knock control	ECM
P1621	Engine control module (ECM)/immobilizer control module – immobilizer codes do not match	Incorrectly programmed immobilizer control module/ECM
P1622	Engine control module (ECM)/immobilizer control module – ignition key codes not match	Incorrect/damaged key, ECM incorrectly programmed
P1623	Engine control module (ECM) – EEPROM error	ECM
P1624	Engine control module (ECM) – immobilizer deactivation signal missing	Battery disconnected – erase trouble code, immobilizer system malfunction
P1627	ECM/ABS electrical connection – communication error	Wiring, ABS control module, ECM
P1631	Alternator – output voltage low	Wiring, alternator drive belt, alternator
P1632	Engine control module (ECM) – supply voltage low	Wiring, alternator, battery
P1633	Engine control module (ECM) – supply voltage high	Wiring, voltage surge when battery disconnected, alternator
P1634	Alternator – output voltage high/battery voltage low	Wiring, alternator, battery
P1649	Engine control module (ECM) – defective	ECM
P1650	Power steering pressure (PSP) switch	Wiring, PSP switch
P1720	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
P1740	Torque converter clutch (TCC) solenoid – open circuit	Wiring open circuit/short to positive, poor connection, TCC solenoid, ECM
P1742	Torque converter clutch (TCC) solenoid – short circuit	Wiring short to earth, poor connection, TCC solenoid, ECM
P1743	Torque converter clutch (TCC) solenoid	Wiring, TCC control solenoid
P1744	Torque converter clutch (TCC) solenoid	Wiring, TCC solenoid
P1751	Shift solenoid (SS) A – open circuit	Wiring open circuit/short to positive, poor connection, SS, ECM
P1752	Shift solenoid (SS) A – short circuit	Wiring short to earth, poor connection, SS, ECM
P1756	Shift solenoid (SS) B – open circuit	Wiring open circuit/short to positive, poor connection, SS, ECM
P1757	Shift solenoid (SS) B – short circuit	Wiring short to earth, poor connection, SS, ECM
P1765	Shift timing solenoid, 3-2	Wiring, shift timing solenoid
P1770	Overrunning clutch solenoid	Wiring, overrunning clutch solenoid
P1771	Throttle position (TP) sensor, AT circuit – open circuit	Wiring open circuit, poor connection, TP sensor, TCM
P1772	Throttle position (TP) sensor, AT circuit – short circuit	Wiring short to earth, poor connection, TP sensor, TCM
P1790	Throttle position (TP) sensor	Wiring, TP sensor



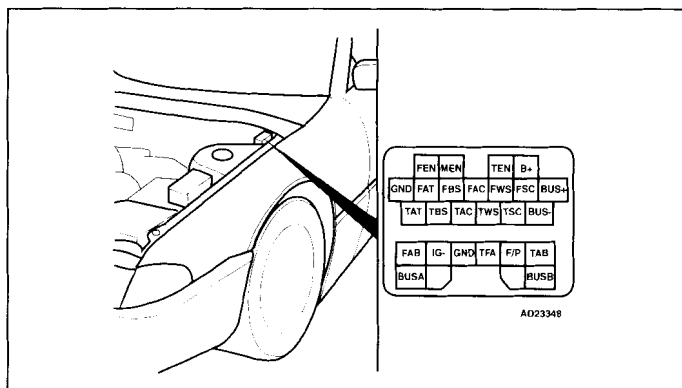
Model: 626/Estate 1,8/2,0 (GF/GW)  
 Year: 1997-99  
 Engine code: FP, FS  
 System: Mazda EGI

**MAZDA**



Engine management/transmission

## Data link connector (DLC) locations



Underbonnet, LH

## Trouble codes

**NOTE:** Engine control module (ECM) incorporates transmission control function.

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Data link connector (DLC) without wiring/terminals in positions FEN & TEN.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	—
P1100	Mass air flow (MAF) sensor – circuit intermittent	Wiring, MAF sensor
P1101	Mass air flow (MAF) sensor – circuit intermittent	Wiring, MAF sensor
P1110	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor
P1112	Intake air temperature (IAT) sensor – circuit intermittent	Wiring, IAT sensor
P1117	Engine coolant temperature (ECT) sensor – circuit intermittent	Wiring, ECT sensor
P1120	Throttle position (TP) sensor – low input	Wiring short to earth, TP sensor
P1125	Throttle position (TP) sensor – circuit intermittent	Wiring, TP sensor
P1130	Fuel trim (FT) – control limit exceeded	Intake/exhaust leak, fuel pressure/pump, EVAP/EGR system, wiring, HO2S
P1131	Heated oxygen sensor (HO2S) – low voltage	Intake/exhaust leak, fuel pressure low, hose connection, HO2S/wiring short to earth, injector(s), MAF sensor/wiring

**MAZDA**

Model: 626/Estate 1,8/2,0 (GF/GW)



Engine management/transmission

EOBD type	Fault location	Probable cause
P1132	Heated oxygen sensor (HO2S) – high voltage	Intake/exhaust blockage, fuel pressure high, EVAP/EGR system, HO2S/wiring short to positive, injector(s), MAF sensor
P1182	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid
P1189	Fuel injection pump position/speed sensor	Wiring, fuel injection pump speed sensor
P1196	Ignition switch, start signal – circuit malfunction	Wiring, starter motor
P1221	Traction control system (TCS) – malfunction	Wiring, TCS malfunction
P1250	Fuel pressure regulator control solenoid	Wiring, fuel pressure regulator control solenoid
P1298	Fuel quantity adjuster control module – circuit malfunction	Wiring, fuel quantity adjuster control module
P1402	Exhaust gas recirculation (EGR) valve position sensor – circuit malfunction	Wiring, EGR valve position sensor
P1409	Exhaust gas recirculation (EGR) valve – circuit malfunction	Wiring, EGR valve
P1474	Engine coolant blower motor relay – circuit malfunction	Wiring, engine coolant blower motor relay
P1500	Vehicle speed sensor (VSS) – intermittent signal	Wiring, VSS
P1504	Idle air control (IAC) valve – circuit intermittent	Wiring, IAC valve
P1602	Engine control module (ECM)/immobilizer control module – communication error	Wiring, reader coil, ignition key, immobilizer control module, ECM
P1603	Ignition key – not programmed into ECM	ECM incorrectly programmed/not programmed
P1604	Engine control module (ECM) – immobilizer code not stored	ECM incorrectly programmed/not programmed
P1621	Engine control module (ECM)/immobilizer control module – immobilizer codes do not match	Incorrectly programmed immobilizer control module/ECM
P1622	Engine control module (ECM)/immobilizer control module – ignition key codes not match	Incorrect/damaged key, ECM incorrectly programmed
P1623	Engine control module (ECM) – EEPROM error	ECM
P1624	Engine control module (ECM) – immobilizer deactivation signal missing	Battery disconnected – erase trouble code, immobilizer system malfunction
P1631	Alternator – output voltage low	Wiring, alternator drive belt, alternator
P1632	Engine control module (ECM) – supply voltage low	Wiring, alternator, battery
P1633	Engine control module (ECM) – supply voltage high	Wiring, voltage surge when battery disconnected, alternator
P1634	Alternator – output voltage high/battery voltage low	Wiring, alternator, battery
P1649	Module coding plug	Wiring, module coding plug
P1650	Power steering pressure (PSP) switch	Wiring, PSP switch
P1744	Torque converter clutch (TCC) solenoid	Wiring, TCC solenoid
P1765	Shift timing solenoid, 3-2	Wiring, shift timing solenoid





Model: 323/Estate 1,6 8V/16V (BG/BW) • 323 1,8 16V (BG)  
626/MX-6 2,5 V6 (GE) • Xedos 6 • Xedos 9  
MX-3 1,6

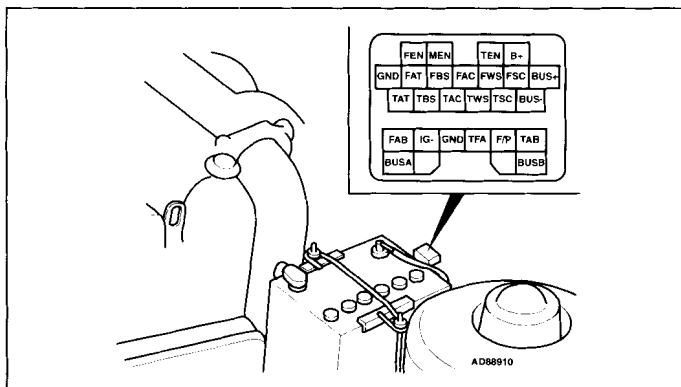
Year: 1989-95

**MAZDA**

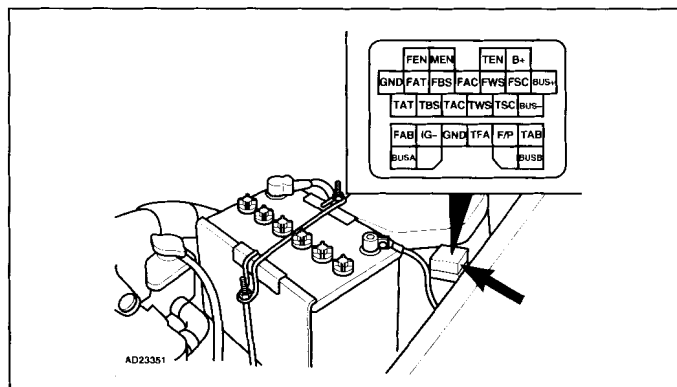


Transmission

## Data link connector (DLC) locations



323 – engine bay, LH



626/MX-6, Xedos 6/9, MX-3 – engine bay, LH

## Trouble codes

### General information

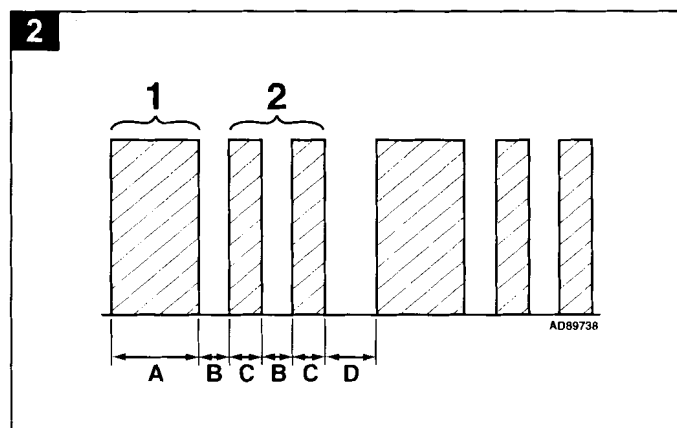
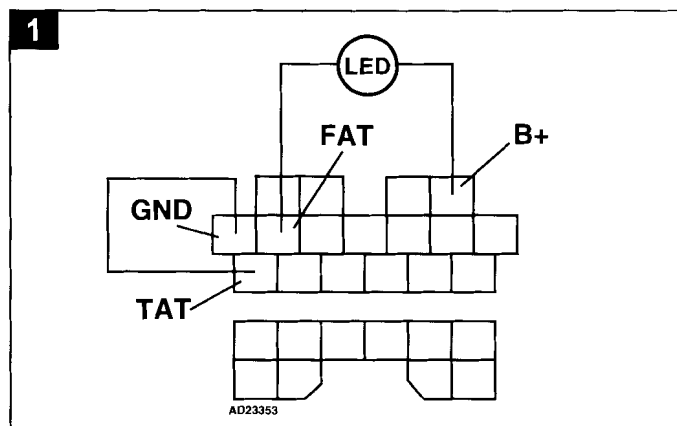
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- The TCM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).

### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals GND and TAT **1**.
- Connect LED test lamp between terminals FAT and B+ **1**.

**NOTE:** Connect LED test lamp positive connection to DLC terminal B+.

- Switch ignition ON.
- Count LED flashes. Note trouble codes. Compare with trouble code table.
- Long flashes indicate the 'tens' **2** [A].
- Short flashes indicate the 'units' **2** [C].
- For example: Trouble code 12 displayed **2**.
- Switch ignition OFF. Rectify faults as necessary.



**MAZDA**

Model: 323/Estate 1,6 8V/16V (BG/BW) • 323 1,8 16V (BG)  
626/MX-6 2,5 V6 (GE) • Xedos 6 • Xedos 9 • MX-3 1,6

**Transmission****Erasing**

- Ensure ignition switched OFF.
- Disconnect battery earth lead for at least 20 seconds.
- Depress brake pedal.
- Reconnect battery earth lead.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

**Trouble code identification**

Flash type	Fault location	Probable cause
01	Ignition pulse missing	Wiring, tachometer, ignition coil, distributor, ECM, TCM
06	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
12	Throttle position (TP) sensor	Wiring, TP sensor adjustment, TP sensor
14	Barometric pressure (BARO) sensor	Wiring, BARO sensor, ECM
55	Input shaft speed (ISS) sensor/turbine shaft speed (TSS) sensor	Wiring, ISS/TSS sensor
56	Transmission fluid temperature (TFT) sensor	Wiring, TFT sensor
57	Engine control module (ECM) – gear shift, torque reduction signal 1	Wiring, ECM, TCM
58	Engine control module (ECM) – gear shift, torque reduction signal 2	Wiring, ECM, TCM
59	Engine control module (ECM) – ECT high, torque reduction signal	Wiring, ECM, TCM
60	Shift solenoid (SS) A, 1-2	Wiring, SS
61	Shift solenoid (SS) B, 2-3	Wiring, SS
62	Shift solenoid (SS) C, 3-4	Wiring, SS
63	Torque converter clutch (TCC) control solenoid	Wiring, TCC control solenoid
64	Shift timing solenoid, 3-2	Wiring, shift timing solenoid
65	Torque converter clutch (TCC) solenoid	Wiring, TCC solenoid
66	Transmission fluid pressure (TFP) solenoid	Wiring, TFP solenoid
71	Closed throttle position (CTP) switch	Wiring, CTP switch



Model: 323 (BA/BJ) • 626/MX-6 (GE)  
626/Estate (GF/GW) • Xedos 6/9 • MX-3 • MX-5  
Year: 1994-00

**MAZDA**



Immobilizer

## Trouble codes

### General information

323 →1997, 626/MX-5 →1996

- No Self-diagnosis information available from immobilizer control module.
- Access engine control module (ECM) fault memory for immobilizer related trouble codes.

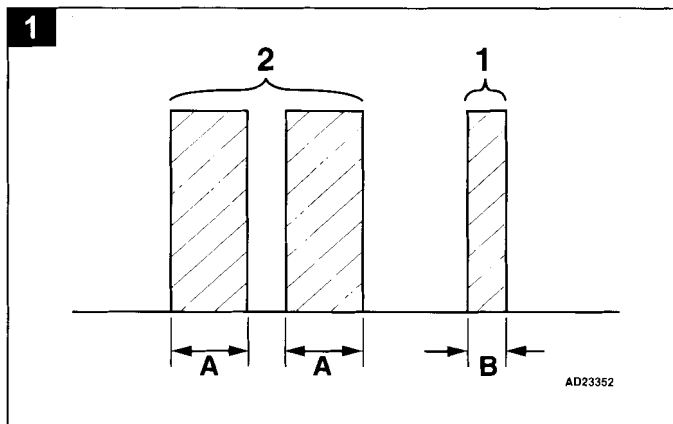
323 1998 →, 626/MX-5 1997 →

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the immobilizer warning lamp.
- System malfunction: During first three engine starts, engine runs for several seconds and then cuts out.
- After third attempt, engine will no longer start.

### Accessing

323 1998 →, MX-5 1997 →

- Turn ignition switch to START position for 2 seconds, then back to ON.
- Wait 2 minutes.
- Count warning lamp flashes. Note trouble codes. Compare with trouble code table.
- Long flashes indicate the LH digit **1** [A].
- Short flashes indicate the RH digit **1** [B].
- For example: Trouble code 21 displayed **1**.
- Switch ignition OFF. Rectify faults as necessary.



626 1997 →

- Trouble codes are displayed by the immobilizer warning lamp.
- Switch ignition ON.
- Count warning lamp flashes. Note trouble codes. Compare with trouble code table.
- Long flashes indicate the LH digit **1** [A].
- Short flashes indicate the RH digit **1** [B].
- For example: Trouble code 21 displayed **1**.
- Switch ignition OFF. Rectify faults as necessary.

### Erasing

323 1998 →, 626/MX-5 1997 →

- Rectifying faults erases trouble codes.

### Trouble code identification

Flash type	Fault location	Probable cause
01	Ignition key – incorrect signal	Ignition key not matched, incorrect ignition key
02	Ignition key – implausible signal	Ignition key damaged
03	Ignition key – no signal	Incorrect/damaged ignition key, wiring, immobilizer read coil
11	Immobilizer read coil	Wiring, immobilizer read coil
21	Immobilizer control module – EEPROM error	Immobilizer control module
24	Engine control module (ECM)/immobilizer control module – wiring open/short circuit	Wiring, ECM, immobilizer control module
30	Engine control module (ECM)/immobilizer control module – communication error	Wiring, ECM, immobilizer control module



# MERCEDES-BENZ

Model: A140/160/190 (168) • A160/170 CDI (168)  
C200/220 CDI (202) • E200/220/270/320 CDI (210)  
Vaneo CDI (414) • Sprinter CDI (901/2/3/4/5)  
V200/220 CDI/Vito (638)

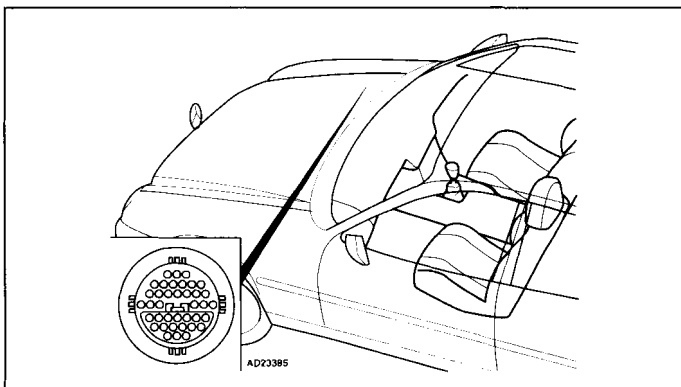
Year: 1998-04

Engine code: 166.940/960/990, 611.960/961/980/981/987,  
612.961/981, 613.961, 668.914/940/941/942

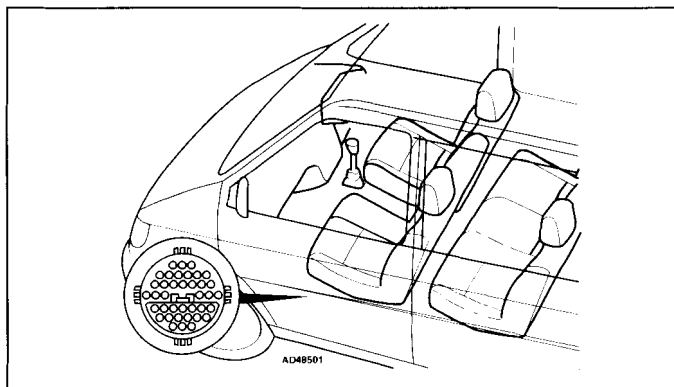
System: Bosch EDC 15C • Bosch MSM

## Engine management

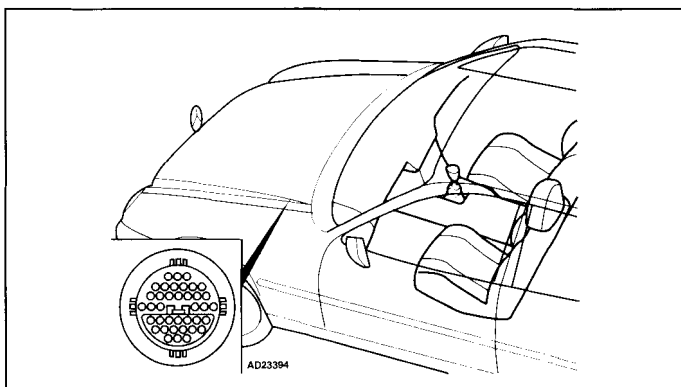
### Data link connector (DLC) locations



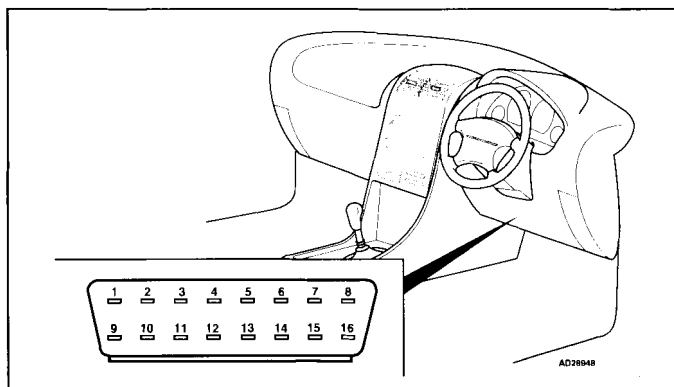
C-Class – RH engine bay



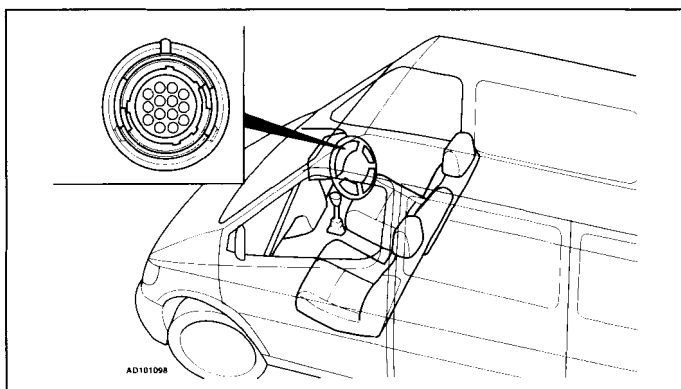
V-Class/Vito – under passenger's seat



E-Class – LH engine bay



Vaneo/A-Class – under steering column



Sprinter – under fascia, driver's side



## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	—
P1105	Barometric pressure (BARO) sensor, in ECM – circuit malfunction	ECM
P1176	Engine oil sensor module – implausible signal	Wiring, connectors, oil quality, oil level, oil sensor, ECM
P1177	Engine oil sensor module – oil temperature implausible	Wiring, connectors, oil quality, oil level, oil sensor, ECM
P1178	Engine oil sensor module – oil level implausible	Wiring, connectors, oil quality, oil level, oil sensor, ECM
P1179	Engine oil sensor module – oil quality implausible	Wiring, connectors, oil quality, oil level, oil sensor, ECM
P1180	Engine oil sensor module – oil temperature too high	Wiring, connectors, oil quality, oil level, oil sensor, ECM
P1181	CAN data bus, engine coolant blower motor/AC condenser blower motor – implausible signal	Wiring, engine coolant temperature sensor, engine coolant blower motor/AC condenser blower motor, engine coolant blower motor control module/AC condenser blower motor control module, ECM
P1185	Engine oil sensor module – water in oil	Wiring, connectors, oil quality, oil level, oil sensor, ECM
P1187	Fuel rail pressure (FRP) sensor – malfunction	Wiring, poor connection, fuel pressure regulator control solenoid, fuel rail pressure (FRP) sensor, fuel level low, fuel pressure, high-pressure fuel pump, injector(s)
P1188	3rd piston cut-off solenoid – malfunction	Wiring, connector, 3rd piston cut-off solenoid
P1189	Intake manifold air control system – malfunction	Wiring, connectors, hoses, intake manifold air control valve
P1190	Fuel pressure control solenoid – malfunction	Wiring, connectors, fuel pressure control solenoid
P1192	Engine oil sensor module – malfunction	Wiring, connectors, engine oil quality/level
P1221	CAN data bus, TCS – malfunction	Wiring, TCS control module trouble code(s) stored
P1222	Accelerator pedal position (APP) sensor 1 – malfunction	Wiring, APP sensor 1, ECM
P1234	Accelerator pedal position (APP) sensor 2 – malfunction	Wiring, APP sensor 2, ECM
P1237	Traction control system (TCS) – defective	TCS control module trouble code(s) stored
P1330	Starter control – malfunction	Wiring, fuse, starter motor, starter motor relay, ECM
P1335	Crankshaft position (CKP) sensor – malfunction	Wiring, connector, CKP sensor, ECM
P1354	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – implausible signal	Wiring, connector, CKP sensor, CMP sensor
P1403	Exhaust gas recirculation (EGR) system – malfunction	Wiring, connectors, hoses, intake leak, EGR solenoid, MAF sensor
P1470	Turbocharger (TC) boost pressure – too low/high	Wiring, connectors, hoses, turbocharger (TC) wastegate regulating valve
P1480	Glow plug warning lamp – malfunction	Wiring, connectors, bulb, instrument panel
P1481	Glow plug(s) – defective	Wiring, connectors, glow plug(s), ECM



**MERCEDES-BENZ**

Model:

A140/160/190 (168) • A160/170 CDI (168) • C200/220 CDI (202)  
E200/220/270/320 CDI (210) • Vaneo CDI (414)  
Sprinter CDI (901/2/3/4/5) • V200/220 CDI/Vito (638)**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1482	Glow plug control module – output stage	Wiring, connectors, glow plug control module
P1510	Cruise control master/selector switch – malfunction	Wiring, connectors, cruise control master/selector switch, ECM
P1520	Cruise control master switch – malfunction	Wiring, connectors, data bus, ignition switch control module, ECM
P1570	Immobilizer system activated – attempted theft detected	Erase trouble code, incorrect/damaged key, immobilizer system malfunction
P1590	Fuel shut-off detected	–
P1592	CAN data bus, automatic clutch system – malfunction	Wiring, trouble code(s) stored in other system(s)
P1610	Engine control relay – defective	Wiring, fuse, engine control relay
P1611	Engine control module (ECM) – internal fault	ECM
P1612	Engine control module (ECM) – supply voltage	Wiring, connector, ignition switch
P1613	Engine control module (ECM) – internal fault	ECM
P1614	Engine control module (ECM) – internal fault	ECM
P1615	Engine control module (ECM) – supply voltage	Wiring, connector, ECM
P1617	Engine control module (ECM) – EPROM error	ECM
P1622	Fuel shut-off solenoid – defective	Wiring, fuel shut-off solenoid
P1630	Immobilizer control module – malfunction	Wiring, data bus, ignition switch control module, ECM
P1636	Engine coolant blower motor control module – malfunction	Wiring, connectors, engine coolant blower motor, ECM
P1650	Starter motor – short circuit	Wiring, connectors, ignition/starter switch, ECM
P1661	Injectors – voltage low/high	Wiring, connectors, injectors, ECM
P1662	Injectors – voltage low/high	Wiring, connectors, injectors, ECM
P1663	Fuel pressure control solenoid – defective	Wiring, connectors, fuel pressure control solenoid
P1664	Auxiliary heater control module/ECM – electrical fault	Wiring, auxiliary heater control module
P1666	Engine control module (ECM) – engine shut-off control	ECM
P1673	Engine coolant blower motor/AC condenser blower motor – short circuit	Wiring, engine coolant temperature sensor, engine coolant blower motor/AC condenser blower motor, engine coolant blower motor control module/AC condenser blower motor control module, ECM
P1681	CAN data bus, SRS control module – malfunction	Wiring, connectors, SRS control module trouble code(s) stored, SRS control module, ECM
P1698	CAN data bus, AC/emergency shut-off – malfunction	Wiring, connectors, AC control module, ECM
P1705	MT: Clutch pedal position (CPP) switch – malfunction	Wiring, connector, CPP switch
P1705	AT: Park/neutral position (PNP) switch	Wiring, PNP switch, TCM, ECM
P1813	Clutch pedal position (CPP) switch – circuit malfunction	Wiring, connector, CPP switch
P1822	Kick-down switch – implausible signal	Wiring, connector, kick-down switch



Model: C180/200/200K/220/230/230K/280 (202)  
 E200/220/280/320 (124) • E200/230/280/320 (210)  
 S280/320 (140) • SLK200 (170) • SL280/320 (129)

Year: 1993-98

Engine code: 104.941/942/943/944/945/991/992/994/995,  
 111.920/921, 111.940/941/942/944/945/946,  
 111.960/961, 111.970/974/975

System: Bosch HFM • Bosch HFM-SFI • Siemens PMS

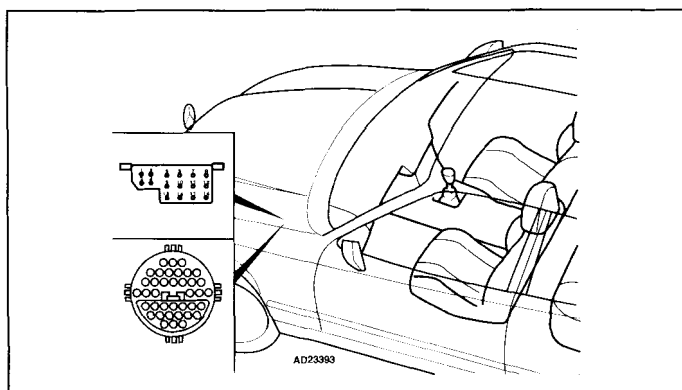
Trouble codes: Two-digit flash type

**MERCEDES-BENZ**

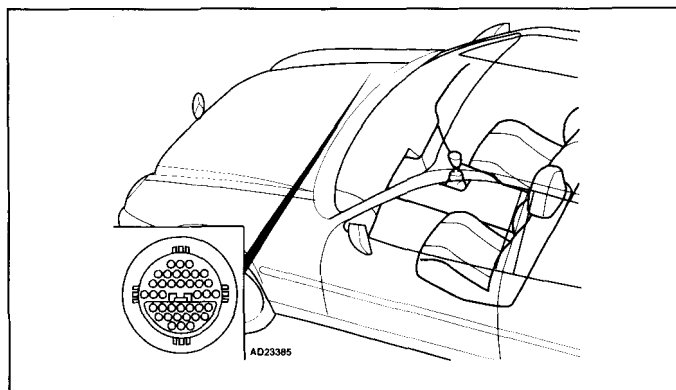


Engine management

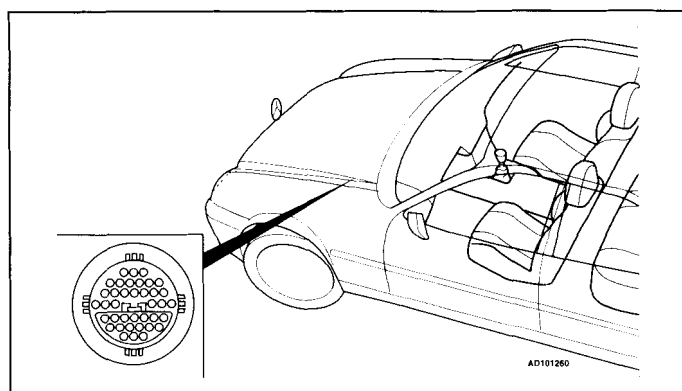
## Data link connector (DLC) locations



E-Class (124), SL-Class



E-Class (210)



C-Class, S-Class, SLK

## Trouble codes

### General information

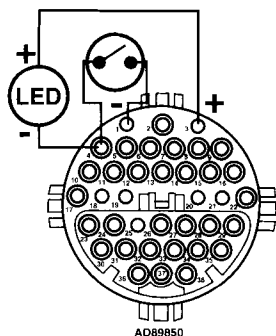
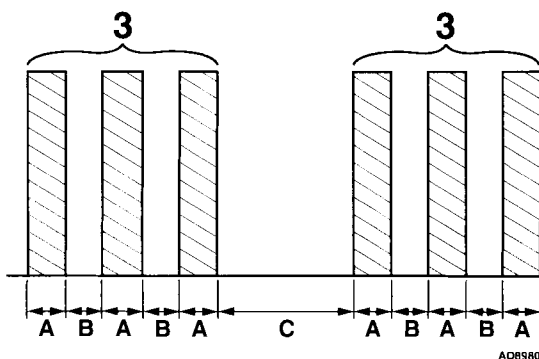
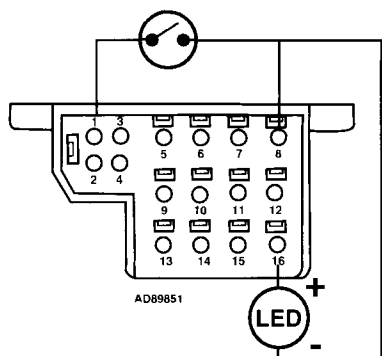
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).
- Diagnostic equipment can also be used to erase data from ECM fault memory.
- More detailed fault diagnosis information can be obtained using diagnostic equipment connected to the data link connector (DLC).

### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 1 and 4 or 1 and 8 with a switched lead – contacts normally open **1** or **2**.
- Connect LED test lamp between terminals 3 and 4 or 8 and 16 **1** or **2**.

**NOTE:** Connect LED test lamp positive connection to terminal 3 or 16.

- Switch ignition ON.
- Operate switch for 2-4 seconds.
- Count LED flashes. Note trouble code.
- Trouble codes consist of short flashes **3**.
- For example: Trouble code 3 displayed **3**.
- Repeat operation. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.

**1****3****2****Erasing**

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 1 and 4 or 1 and 8 with a switched lead – contacts normally open **1** or **2**.
- Connect LED test lamp between terminals 3 and 4 or 8 and 16 **1** or **2**.

**NOTE:** Connect LED test lamp positive connection to terminal 3 or 16.

- Operate switch for 2-4 seconds.
- Operate switch for 5-6 seconds – Bosch ECM →08/93.
- Allow LED to display trouble code.
- Operate switch for 6-8 seconds.
- Operate switch for 8-9 seconds – Bosch ECM →08/93.
- Repeat operation to erase all stored trouble codes.
- After erasing trouble code 1: Switch ignition OFF.
- Wait 2 seconds.
- Switch ignition ON.
- Wait 10 seconds minimum.
- Start engine.

**Trouble code identification**

2-digit flash type	Fault location	Probable cause
1	No fault found	–
2	Engine coolant temperature (ECT) sensor – electrical fault	Wiring, connector, ECT sensor, ECM
3	Intake air temperature (IAT) sensor – electrical fault	Wiring, connector, IAT sensor, ECM
4	Bosch HFM: Mass air flow (MAF) sensor – range/performance problem	Wiring, connector, intake leak, MAF sensor, ECM
	Siemens PMS: Manifold absolute pressure (MAP) sensor – vacuum leak	Hoses, ECM
5	Idle speed control (ISC) actuator – malfunction	Wiring, connector, ISC actuator
6	Throttle position (TP) sensor – range/performance problem	Wiring, connector, TP sensor, ECM
7	Idle speed control (ISC) actuator – malfunction	Wiring, connector, ISC actuator, ECM
8	Idle speed control (ISC) – malfunction	Wiring, connector, intake leak, MAF sensor, throttle valve tight/sticking





2-digit flash type	Fault location	Probable cause
9 <b>1</b>	Heated oxygen sensor (HO2S) 1 – range/performance problem	Wiring, connector, HO2S
10	Heated oxygen sensor (HO2S) 2 – range/performance problem	Wiring, connector, HO2S
11	Oxygen sensor heater 1 – electrical fault	Wiring, connector, HO2S, ECM
12	Oxygen sensor heater 2 – electrical fault	Wiring, connector, HO2S, ECM
13	Lambda regulation – system too lean/rich	Wiring, intake/exhaust leak, MAF sensor, fuel pressure, injector(s), ECM
14	Bosch HFM: Injector 1 – circuit malfunction	Wiring, injector, ECM
	Siemens PMS: Injector 1 & 4 – circuit malfunction	Wiring, injector, ECM
15	Bosch HFM: Injector 2 – circuit malfunction	Wiring, injector, ECM
	Siemens PMS: Injector 2 & 3 – circuit malfunction	Wiring, injector, ECM
16	Injector 3 – circuit malfunction	Wiring, injector, ECM
17	Injector 4 – circuit malfunction	Wiring, injector, ECM
18	Injector 5 – circuit malfunction	Wiring, injector, ECM
19	Injector 6 – circuit malfunction	Wiring, injector, ECM
20	Bosch HFM: Fuel trim (FT), idle speed – range/performance problem	Intake/exhaust leak, injector(s), fuel pressure, HO2S, ECM
	Siemens PMS: Fuel trim (FT) – range/performance problem	Intake/exhaust leak, injector(s), fuel pressure, HO2S, EVAP system, ECM
21	111: Ignition amplifier/ignition coil, cylinder 1 & 4 – defective	Wiring, ignition amplifier, ignition coil, ECM
	104: Ignition amplifier/ignition coil, cylinder 1 & 6 – defective	Wiring, ignition amplifier, ignition coil, ECM
22	Bosch HFM: Ignition amplifier 1/ignition coil, cylinder 1 – defective	Wiring, ignition amplifier, ignition coil, ECM
	Siemens PMS: Ignition amplifier/ignition coil, cylinder 2 & 3 – defective	Wiring, ignition amplifier, ignition coil, ECM
	104: Ignition amplifier/ignition coil, cylinder 2 & 5 – defective	Wiring, ignition amplifier, ignition coil, ECM
23	111: Ignition amplifier 2/ignition coil, cylinder 2 & 3 – defective	Wiring, ignition amplifier, ignition coil, ECM
	104: Ignition amplifier/ignition coil, cylinder 3 & 4 – defective	Wiring, ignition amplifier, ignition coil, ECM
24	Crankshaft position (CKP) sensor – malfunction	Wiring, air gap, flywheel ring gear damaged, CKP sensor
25	Camshaft position (CMP) sensor – incorrect signal	Wiring, CMP sensor
26	Engine control module (ECM) coding plug – electrical fault	Wiring, ECM
27	Engine control module (ECM), RPM signal – output	Wiring, RPM sensor, ECM
28	ABS control module/engine control module (ECM) communication – VSS signal	Wiring, VSS, ABS control module trouble code(s) stored
29 <b>2</b>	Intake manifold heater relay – malfunction	Wiring, intake manifold heater relay, ECM
30	Fuel pump relay – defective	Wiring, fuel pump relay
31	Without cat: CO adjustment resistor – malfunction	Wiring, CO adjustment resistor, ECM

**MERCEDES-BENZ**Model: C180/200/200K/220/230/230K/280 (202) • E200/220/280/320 (124)  
E200/230/280/320 (210) • S280/320 (140) • SLK200 (170)  
SL280/320 (129)**Engine management**

2-digit flash type	Fault location	Probable cause
32	Knock sensor(s) (KS) – defective	Wiring, KS
33	Ignition timing, knocking – maximum retardation reached	Fuel contamination, mechanical fault
34	Engine control module (ECM), knock control – internal fault	ECM
35	Secondary air injection (AIR) pump/relay – malfunction	Wiring, AIR pump/relay, ECM
36	Evaporative emission (EVAP) canister purge valve – electrical fault	Wiring, EVAP canister purge valve, hose(s), ECM
37	Transmission shift control valve – electrical fault	Wiring, transmission shift control valve
38	Camshaft position (CMP) actuator – malfunction	Wiring, mechanical fault, CMP actuator, ECM
39	Exhaust gas recirculation (EGR) solenoid – malfunction	Wiring, EGR solenoid, hose(s)
40	Transmission overload protection switch – malfunction	Wiring, transmission overload protection switch
41	CAN data bus, ECM – malfunction	Wiring, ECM
42	111: CAN data bus, diagnostic module – malfunction	Wiring
	104: CAN data bus – malfunction	Wiring
43	Engine control module (ECM), pin 50 – starter signal	Wiring
45	With cruise control system: Cruise control, inertia fuel shut-off (IFS) switch – active	Wiring, TP sensor, idle speed control (ISC) actuator
46	Intake manifold air control solenoid – malfunction	Wiring, intake manifold air control solenoid, ECM
48	Oxygen sensor heater relay 2 – electrical fault	Wiring, oxygen sensor heater relay, ECM
49	Engine control module (ECM) – supply voltage	Wiring, ignition switch, overvoltage protection relay
50	Engine control module (ECM) – internal fault	ECM

**1** →12/92: Code may be displayed although no fault exists**2** E-Class (124) →07/93



Model: C180/200/200K/220/230/230K/280 (202)  
E200/220/280/320 (124) • E200/230/280/320 (210)  
S280/320 (140) • SLK200 (170) • SL280/320 (129)

Year: 1993-98

Engine code: 104.941/942/943/944/945, 104.991/992/994/995,  
111.920/921, 111.940/941/942/944/945/946,  
111.960/961, 111.970/974/975

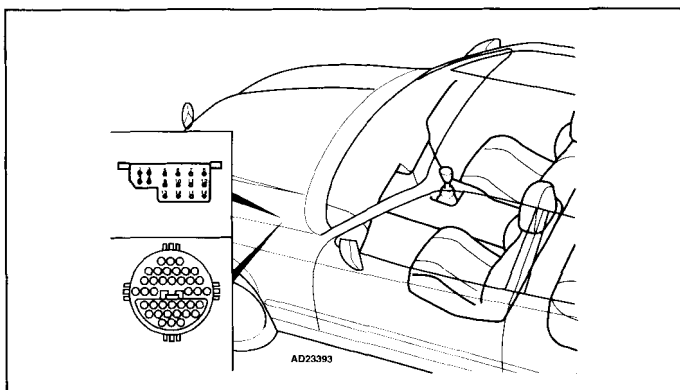
System: Bosch HFM • Bosch HFM-SFI • Siemens PMS

Trouble codes: Three-digit

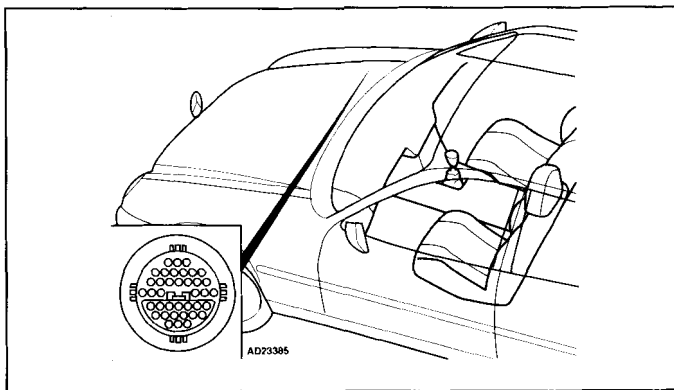
**MERCEDES-BENZ**

Engine management

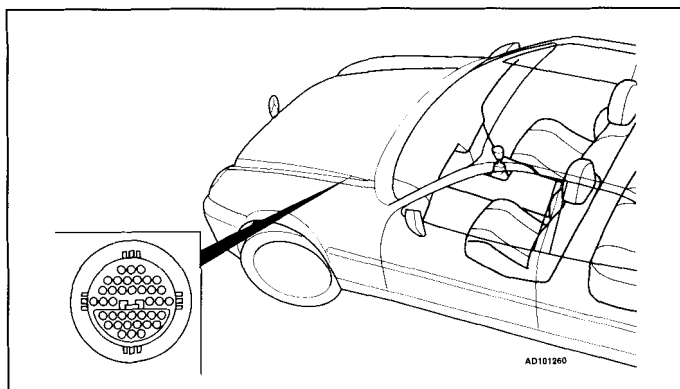
## Data link connector (DLC) locations



E-Class (124), SL-Class



E-Class (210)



C-Class, S-Class, SLK

## Trouble codes

### General information

- ☐ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ☐ Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- ☐ The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).
- ☐ Diagnostic equipment can also be used to erase data from ECM fault memory.
- ☐ More detailed fault diagnosis information can be obtained using diagnostic equipment connected to the data link connector (DLC).

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**MERCEDES-BENZ**

Model:

C180/200/200K/220/230/230K/280 (202) • E200/220/280/320 (124)  
E200/230/280/320 (210) • S280/320 (140) • SLK200 (170)  
SL280/320 (129)**Engine management****Trouble code identification**

3-digit type	Fault location	Probable cause
–	No fault found	–
002	Engine coolant temperature (ECT) sensor – short circuit	Wiring, connector, ECT sensor, ECM
003	Engine coolant temperature (ECT) sensor – open circuit	Wiring, connector, ECT sensor, ECM
004	Engine coolant temperature (ECT) sensor – range/performance problem	–
005	Engine coolant temperature (ECT) sensor – plug connection(s)	Multi-plug(s)
006	Intake air temperature (IAT) sensor – short circuit	Wiring, connector, IAT sensor, ECM
007	Intake air temperature (IAT) sensor – open circuit	Wiring, connector, IAT sensor, ECM
008	Intake air temperature (IAT) sensor – plug connection(s)	Multi-plug(s)
009	Bosch HFM: Mass air flow (MAF) sensor – range/performance problem	Wiring, connector, intake leak, MAF sensor
	Siemens PMS: Manifold absolute pressure (MAP) sensor – vacuum leak	Hoses, ECM
010	Bosch HFM: Mass air flow (MAF) sensor – open circuit	Wiring, connector, MAF sensor, ECM
	Siemens PMS: Manifold absolute pressure (MAP) sensor – vacuum leak	Hoses, ECM
011	Idle speed control (ISC) actuator – range/performance problem	Wiring, connector, ISC actuator
012	Idle speed control (ISC) actuator – circuit malfunction	Wiring, connector, ISC actuator
013	Bosch HFM: Idle speed control (ISC) actuator – plug connection(s)	Multi-plug(s)
	Siemens PMS: Throttle position (TP) sensor – range/performance problem	Wiring, connector, TP sensor, ECM
014	Throttle position (TP) sensor – signal high	Wiring, connector, TP sensor, ECM
015	Throttle position (TP) sensor – signal low	Wiring, connector, TP sensor, ECM
016	Bosch HFM: Throttle position (TP) sensor – plug connection(s)	Multi-plug(s)
	Siemens PMS: Idle speed control (ISC) actuator – malfunction	Wiring, connector, ISC actuator, ECM
017	Idle speed control (ISC) actuator – signal high	Wiring, connector, ISC actuator, ECM
018	Idle speed control (ISC) actuator – signal low	Wiring, connector, ISC actuator, ECM
019	Bosch HFM: Idle speed control (ISC) actuator – plug connection(s)	Multi-plug(s)
	Siemens PMS: Idle speed control (ISC) – malfunction	Wiring, connector, intake leak, MAF sensor, throttle valve tight/sticking
020	Idle speed control (ISC) – lower limit reached	Wiring, connector, intake leak, MAF sensor, throttle valve tight/sticking
021	Idle speed control (ISC) – upper limit reached	Wiring, connector, intake leak, MAF sensor, throttle valve tight/sticking
022	Cruise control/idle speed control (ISC) actuator – limp-home mode	Wiring, ISC actuator, throttle valve tight/sticking
022	Siemens PMS: Heated oxygen sensor (HO2S) 1 – range/performance problem	Wiring, connector, HO2S
023	Heated oxygen sensor (HO2S) 1 – voltage high	Wiring, connector, HO2S





3-digit type	Fault location	Probable cause
024	Heated oxygen sensor (HO2S) 1 – open circuit	Wiring, connector, HO2S
025	Bosch HFM: Heated oxygen sensor (HO2S) 1 – range/performance problem	Wiring, connector, HO2S
	Siemens PMS: Oxygen sensor heater 1 – electrical fault	Wiring, connector, HO2S, ECM
026	Bosch HFM: Heated oxygen sensor (HO2S) 2 – voltage high	Wiring, connector, HO2S
	Siemens PMS: Oxygen sensor heater 1 – electrical fault	Wiring, connector, HO2S, ECM
027	Bosch HFM: Heated oxygen sensor (HO2S) 2 – open circuit	Wiring, connector, HO2S
	Siemens PMS: Oxygen sensor heater 1 – electrical fault	Wiring, connector, HO2S, ECM
028	Bosch HFM: Heated oxygen sensor (HO2S) 2 – range/performance problem	Wiring, connector, HO2S
	Siemens PMS: Lambda regulation – system too lean	Wiring, intake/exhaust leak, MAF sensor, fuel pressure, injector(s), ECM
029	Bosch HFM: Oxygen sensor heater – current low	Wiring, connector, HO2S, ECM
	Siemens PMS: Lambda regulation – system too rich	Wiring, intake/exhaust leak, MAF sensor, fuel pressure, injector(s), ECM
030	Bosch HFM: Oxygen sensor heater – current high	Wiring, connector, HO2S, ECM
	Siemens PMS: Injector 1 & 4 – circuit malfunction	Wiring, injector, ECM
031	Bosch HFM: Oxygen sensor heater – short circuit	Wiring, connector, HO2S, ECM
	Siemens PMS: Injector 1 & 4 – circuit malfunction	Wiring, injector, ECM
032	Bosch HFM: Oxygen sensor heater 2 – current low	Wiring, connector, HO2S, ECM
	Siemens PMS: Injector 2 & 3 – circuit malfunction	Wiring, injector, ECM
033	Bosch HFM: Oxygen sensor heater 2 – current high	Wiring, connector, HO2S, ECM
	Siemens PMS: Injector 2 & 3 – circuit malfunction	Wiring, injector, ECM
034	Bosch HFM: Oxygen sensor heater 2 – short circuit	Wiring, connector, HO2S, ECM
	Siemens PMS: Fuel trim (FT) – range/performance problem	Intake/exhaust leak, injector(s), fuel pressure, HO2S, EVAP system, ECM
035	Lambda regulation – system too lean	Wiring, intake/exhaust leak, MAF sensor, fuel pressure, injector(s), ECM
036	Lambda regulation – system too rich	Wiring, intake/exhaust leak, MAF sensor, fuel pressure, injector(s), ECM
037	Injector 1 – short to positive	Wiring short to positive, injector, ECM
038	Bosch HFM: Injector 1 – open circuit/short to earth	Wiring open circuit/short to earth, injector, ECM
	Siemens PMS: Ignition amplifier/ignition coil, cylinder 1 & 4 – defective	Wiring, ignition amplifier, ignition coil, ECM
039	Bosch HFM: Injector 2 – short to positive	Wiring short to positive, injector, ECM
	Siemens PMS: Ignition amplifier/ignition coil, cylinder 1 & 4 – defective	Wiring, ignition amplifier, ignition coil, ECM
040	Bosch HFM: Injector 2 – open circuit/short to earth	Wiring open circuit/short to earth, injector, ECM
	Siemens PMS: Ignition amplifier/ignition coil, cylinder 1 & 4 – defective	Wiring, ignition amplifier, ignition coil, ECM
041	Bosch HFM: Injector 3 – short to positive	Wiring short to positive, injector, ECM
	Siemens PMS: Ignition amplifier/ignition coil, cylinder 2 & 3 – defective	Wiring, ignition amplifier, ignition coil, ECM



**MERCEDES-BENZ**

Model: C180/200/200K/220/230/230K/280 (202) • E200/220/280/320 (124)  
 E200/230/280/320 (210) • S280/320 (140) • SLK200 (170)  
 SL280/320 (129)

**Engine management**

3-digit type	Fault location	Probable cause
042	Bosch HFM: Injector 3 – open circuit/short to earth	Wiring open circuit/short to earth, injector, ECM
	Siemens PMS: Ignition amplifier/ignition coil, cylinder 2 & 3 – defective	Wiring, ignition amplifier, ignition coil, ECM
043	Bosch HFM: Injector 4 – short to positive	Wiring short to positive, injector, ECM
	Siemens PMS: Ignition amplifier/ignition coil, cylinder 2 & 3 – defective	Wiring, ignition amplifier, ignition coil, ECM
044	Bosch HFM: Injector 4 – open circuit/short to earth	Wiring open circuit/short to earth, injector, ECM
	Siemens PMS: Crankshaft position (CKP) sensor – malfunction	Wiring, air gap, flywheel ring gear damaged, CKP sensor
045	111: Crankshaft position (CKP) sensor – malfunction	Wiring, air gap, flywheel ring gear damaged, CKP sensor
	104: Injector 5 – short to positive	Wiring short to positive, injector, ECM
046	111: Crankshaft position (CKP) sensor – malfunction	Wiring, air gap, flywheel ring gear damaged, CKP sensor
	104: Injector 5 – open circuit/short to earth	Wiring open circuit/short to earth, injector, ECM
047	111: Engine control module (ECM) coding plug – electrical fault	Wiring, ECM
	104: Injector 6 – short to positive	Wiring short to positive, injector, ECM
048	111: Engine control module (ECM) coding plug – electrical fault	Wiring, ECM
	104: Injector 6 – open circuit/short to earth	Wiring open circuit/short to earth, injector, ECM
049	Bosch HFM: Fuel trim (FT), idle speed – mixture rich	Intake/exhaust leak, injector(s), fuel pressure, HO2S, ECM
	Siemens PMS: Engine control module (ECM), RPM signal – output/short to earth	Wiring short to earth, RPM sensor
050	Bosch HFM: Fuel trim (FT), idle speed – mixture lean	Intake/exhaust leak, injector(s), fuel pressure, HO2S, ECM
	Siemens PMS: Engine control module (ECM), RPM signal – output/short to positive	Wiring short to positive, RPM sensor
051	Bosch HFM: Fuel trim (FT), lower part load – mixture rich	Intake/exhaust leak, injector(s), fuel pressure, HO2S, ECM
	Siemens PMS: ABS control module/engine control module (ECM) communication – VSS signal	Wiring, VSS, ABS control module trouble code(s) stored
052	Bosch HFM: Fuel trim (FT), lower part load – mixture lean	Intake/exhaust leak, injector(s), fuel pressure, HO2S, ECM
	Siemens PMS: ABS control module/engine control module (ECM) communication – VSS signal	Wiring, VSS, ABS control module trouble code(s) stored
053	Fuel trim (FT), upper part load – mixture rich	Intake/exhaust leak, injector(s), fuel pressure, HO2S, ECM
053 	Intake manifold heater relay – malfunction	Wiring, intake manifold heater relay, ECM
054	Fuel trim (FT), upper part load – mixture lean	Intake/exhaust leak, injector(s), fuel pressure, HO2S, ECM
054 	Intake manifold heater relay – malfunction	Wiring, intake manifold heater relay, ECM
055	Bosch HFM: Ignition amplifier 1/ignition coil, cylinder 1 – misfire	Wiring, ignition amplifier, ignition coil, ECM
	Siemens PMS: Fuel pump relay – defective	Wiring, fuel pump relay
	104: Ignition amplifier 1/ignition coil, cylinder 2 – misfire	Wiring, ignition amplifier, ignition coil, ECM

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SL280/320 (129)

**MERCEDES-BENZ**



Engine management

3-digit type	Fault location	Probable cause
056	Bosch HFM: Ignition amplifier 1/ignition coil, cylinder 4 – misfire	Wiring, ignition amplifier, ignition coil, ECM
	Siemens PMS: Fuel pump relay – defective	Wiring, fuel pump relay
	104: Ignition amplifier 1/ignition coil, cylinder 5 – misfire	Wiring, ignition amplifier, ignition coil, ECM
057	Bosch HFM: Ignition amplifier 1/ignition coil, cylinder 1 & 4 – defective	Wiring, ignition amplifier, ignition coil, ECM
	Siemens PMS: CO adjustment resistor – malfunction	Wiring, CO adjustment resistor, ECM
	104: Ignition amplifier 3/ignition coil, cylinder 2 & 5 – defective	Wiring, ignition amplifier, ignition coil, ECM
058	Bosch HFM: Ignition amplifier 2/ignition coil, cylinder 2 – misfire	Wiring, ignition amplifier, ignition coil, ECM
	Siemens PMS: CO adjustment resistor – malfunction	Wiring, CO adjustment resistor, ECM
	104: Ignition amplifier 2/ignition coil, cylinder 3 – misfire	Wiring, ignition amplifier, ignition coil, ECM
059	Bosch HFM: Ignition amplifier 2/ignition coil, cylinder 3 – misfire	Wiring, ignition amplifier, ignition coil, ECM
	Siemens PMS: Evaporative emission (EVAP) canister purge valve – electrical fault	Wiring, EVAP canister purge valve, hose(s), ECM
	104: Ignition amplifier 2/ignition coil, cylinder 4 – misfire	Wiring, ignition amplifier, ignition coil, ECM
060	Bosch HFM: Ignition amplifier 2/ignition coil, cylinder 2 & 3 – defective	Wiring, ignition amplifier, ignition coil, ECM
	Siemens PMS: Evaporative emission (EVAP) canister purge valve – electrical fault	Wiring, EVAP canister purge valve, hose(s), ECM
	104: Ignition amplifier 2/ignition coil, cylinder 3 & 4 – defective	Wiring, ignition amplifier, ignition coil, ECM
061	111: Short term fuel trim (FT), idle speed/part load – malfunction	Fuel system
	104: Ignition amplifier 3/ignition coil, cylinder 1 – misfire	Wiring, ignition amplifier, ignition coil, ECM
062	111: Transmission shift control valve – electrical fault	Wiring, transmission shift control valve
	104: Ignition amplifier 3/ignition coil, cylinder 6 – misfire	Wiring, ignition amplifier, ignition coil, ECM
063	111: Engine control module (ECM) – supply voltage	Wiring, connector, fuse, ignition switch, central locking control module, engine control relay
	104: Ignition amplifier 3/ignition coil, cylinder 1 & 6 – defective	Wiring, ignition amplifier, ignition coil, ECM
064	Bosch HFM: Crankshaft position (CKP) sensor – signal	Wiring, air gap, flywheel ring gear damaged, CKP sensor
	Siemens PMS: Central locking control module, immobilizer signal – open circuit/short to positive	Wiring, central locking control module, trouble code(s) stored in other system(s)
065	Bosch HFM: Crankshaft position (CKP) sensor – defective	Wiring, air gap, flywheel ring gear damaged, CKP sensor
	Siemens PMS: Central locking control module, immobilizer signal – open circuit/short to earth	Wiring, central locking control module, trouble code(s) stored in other system(s)
066	Bosch HFM: Crankshaft position (CKP) sensor – range/performance problem	Wiring, air gap, flywheel ring gear damaged, CKP sensor
	Siemens PMS: Attempt to start engine while central locking still activated	Erase fault memory, trouble code(s) stored in other system(s)



## Engine management

3-digit type	Fault location	Probable cause
067	Bosch HFM: Camshaft position (CMP) sensor – incorrect signal	Wiring, CMP sensor
	Siemens PMS: Central locking control module, immobilizer signal – plausibility	Wrong central locking control module
068	Engine control module (ECM) coding plug – short to earth	Wiring short to earth, ECM
069	Engine control module (ECM) coding plug – open circuit/short to positive	Wiring open circuit/short to positive, ECM
070	Engine control module (ECM), RPM signal – output/short to earth	Wiring short to earth, RPM sensor
071	Engine control module (ECM), RPM signal – output/short to positive	Wiring short to positive, RPM sensor
072	ABS control module/engine control module (ECM) communication, VSS signal – signal not recognised	Wiring, VSS, ABS control module trouble code(s) stored
073	ABS control module/engine control module (ECM) communication, VSS signal – signal high	Wiring, VSS, ABS control module trouble code(s) stored
074	Intake manifold heater relay – short to positive	Wiring short to positive, intake manifold heater relay, ECM
075	Intake manifold heater relay – open circuit/short to earth	Wiring open circuit/short to earth, intake manifold heater relay, ECM
075	Engine control module (ECM), ETC signal – not recognised/short to positive	Wiring, electronic traction control (ETC) module
076	Fuel pump relay – defective	Wiring, fuel pump relay
077	Without cat: CO adjustment resistor – short to positive	Wiring short to positive, CO adjustment resistor, ECM
078	Without cat: CO adjustment resistor – malfunction	Wiring, connector(s), CO adjustment resistor, ECM
079	Knock sensor(s) (KS) 1 – open circuit	Wiring, KS
080	Knock sensor(s) (KS) 2 – open circuit	Wiring, KS
081	Ignition timing, knocking – maximum retardation reached	Fuel contamination, mechanical fault
082	Ignition timing, knocking – firing angle between cylinders	Fuel contamination, mechanical fault
083	111: Secondary air injection (AIR) pump/relay – malfunction	Wiring, AIR pump/relay, ECM
	104: Engine control module (ECM), knock control – internal fault	ECM
084	Short term fuel trim (FT), max. value – idle speed/part load	Fuel system, ECM
085	Secondary air injection (AIR) pump/relay – malfunction	Wiring, AIR pump/relay, ECM
086	Evaporative emission (EVAP) canister purge valve – open circuit/short circuit	Wiring, AIR pump/relay, ECM
087	Evaporative emission (EVAP) canister purge valve – short to positive	Wiring short to positive, AIR pump/relay, ECM
088	Transmission shift control valve – electrical fault	Wiring, transmission shift control valve
089	Camshaft position (CMP) actuator – short to positive	Wiring, CMP actuator, ECM
090	Camshaft position (CMP) actuator – open circuit/short to earth	Wiring, CMP actuator, ECM
091	Exhaust gas recirculation (EGR) solenoid – short to positive	Wiring short to positive, EGR solenoid, hose(s)



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SL280/320 (129)

**MERCEDES-BENZ**



Engine management

3-digit type	Fault location	Probable cause
092	Exhaust gas recirculation (EGR) solenoid – open circuit/short to earth	Wiring open circuit/short to earth, EGR solenoid, hose(s)
093	Transmission overload protection switch – short to earth	Wiring short to earth, transmission overload protection switch
094	Transmission overload protection switch – switch closed	Wiring, transmission overload protection switch
095	Transmission overload protection switch – switch open	Wiring, transmission overload protection switch
096	Transmission overload protection switch – plausibility	Wiring, transmission overload protection switch
097	CAN data bus, ECM – malfunction	Wiring, ECM
098	CAN data bus, ASR system – malfunction	Wiring
099	CAN data bus, cruise control system/TP control module – malfunction	Wiring
100	CAN data bus, diagnostic module – malfunction	Wiring
101	Engine control module (ECM), pin 50 – starter signal	Wiring
104	With AT/cruise control system: Cruise control, inertia fuel shut-off (IFS) switch – active	Wiring, TP sensor, idle speed control (ISC) actuator
105	Intake manifold air control solenoid – short to positive	Wiring, intake manifold air control solenoid, ECM
106	Intake manifold air control solenoid – open circuit/short to earth	Wiring, intake manifold air control solenoid, ECM
107	Ignition amplifier – malfunction	Wiring, ignition amplifier, ignition coil(s), ECM
108	Oxygen sensor heater relay 2 – short to positive	Wiring short to positive, oxygen sensor heater relay, ECM
109	Oxygen sensor heater relay 2 – open circuit/short to earth	Wiring open circuit/short to earth, oxygen sensor heater relay, ECM
110	Engine control module (ECM) – supply voltage, plausibility	Wiring, ignition switch, overvoltage protection relay
111	Engine control module (ECM) – supply voltage low	Wiring, ignition switch, overvoltage protection relay
112	Engine control module (ECM) – internal fault	ECM
113	Engine control module (ECM) – coding	Not coded
114	Engine control module (ECM) – identification	ECM not coded, ECM
115	Engine control module (ECM) – coding	Not coded, ECM
116	CAN data bus, remote central locking – malfunction	Wiring
	Bosch HFM 06/93 →: Engine control module (ECM) – supply voltage low	Wiring, connector, fuse, overvoltage protection relay
117	Attempt to start engine while central locking still activated	Erase fault memory, trouble code(s) stored in other system(s)
118	Supercharger (SC) – malfunction	Wiring, mechanical fault, hose(s), intake air flap control actuator, ECM
119	Supercharger (SC) clutch – open circuit/short to earth	Wiring open circuit/short to earth, SC clutch, ECM
120	Electronic traction control (ETC) – signal	Wiring short to earth, ETC module
123	Intake air flap control actuator, supercharger (SC) – malfunction	Wiring open circuit/short to earth, intake air flap control actuator, ECM
124	Intake air flap control actuator, supercharger (SC) – malfunction	Wiring short to positive, intake air flap control actuator, ECM
125	Engine control module (ECM) – internal fault	ECM
126	Engine control module (ECM) – internal fault	ECM

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**Engine management**

3-digit type	Fault location	Probable cause
127	Idle speed control (ISC) actuator/ISC actuator, cruise control system – malfunction	Wiring, ISC actuator, ISC actuator – cruise control system
128	Engine control module (ECM) – internal fault	ECM
129	Engine control module (ECM) – internal fault	ECM
130	Throttle position (TP) sensor – malfunction	Wiring, TP sensor, ECM
131	Engine control module (ECM) – internal fault	ECM
132	Engine control module (ECM) – internal fault	ECM
133	Idle speed control (ISC) actuator – defective	Wiring, ISC actuator
134	Engine control module (ECM) – internal fault	ECM
135	Idle speed control (ISC) actuator – supply voltage	Wiring, ECM
136	Idle speed control (ISC) actuator – defective	Wiring, ISC actuator, ECM
137	Engine control module (ECM) – internal fault	ECM
138	Idle speed control (ISC) actuator – defective	Wiring, ISC actuator
139	Cruise control selector switch – defective	Wiring, cruise control selector switch
140	Engine control module (ECM) – internal fault	ECM
141	Engine control module (ECM) – internal fault	ECM
142	Engine control module (ECM) – internal fault	ECM
143	Brake pedal position (BPP) switch, cruise control system – defective	Wiring, BPP switch
144	Engine control module (ECM) – internal fault	ECM
145	CAN data bus, VSS signal, rear axle – malfunction	Wiring, trouble code(s) stored in other system(s)
146	CAN data bus, VSS signal, front axle – malfunction	Wiring, trouble code(s) stored in other system(s)
147	CAN data bus, AC – malfunction	Wiring, AC control module trouble code(s) stored
148	Starter motor relay – short to positive	Wiring, ignition switch, ECM
149	Starter motor relay – short to earth	Wiring, ignition switch, ECM
150	CAN data bus, AT – malfunction	Wiring, TCM trouble code(s) stored
151	CAN data bus, AC – malfunction	Wiring, AC control module trouble code(s) stored
152	CAN data bus – malfunction	Wiring
153	Engine coolant blower motor/AC condenser blower motor – short to positive	Wiring, ECT sensor, AC control module, ECM
154	Engine coolant blower motor/AC condenser blower motor – short to earth	Wiring, ECT sensor, AC control module, ECM
155	Transmission control module (TCM) – coding	Incorrectly coded
156	CAN data bus, ABS/ETC – plausibility	Wiring, trouble code(s) stored in other system(s)
157	CAN data bus, ABS/ETC – plausibility	Wiring, trouble code(s) stored in other system(s)
158	CAN data bus, ABS – plausibility	Wiring, ABS control module trouble code(s) stored

1 E-Class (124) →07/93, Siemens PMS

2 E-Class (124) →07/93

2 SLK200 (170)





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CLK200/200K/230K/320/430 (208) • SL280/320/500/600 (129) • SL500 (230)

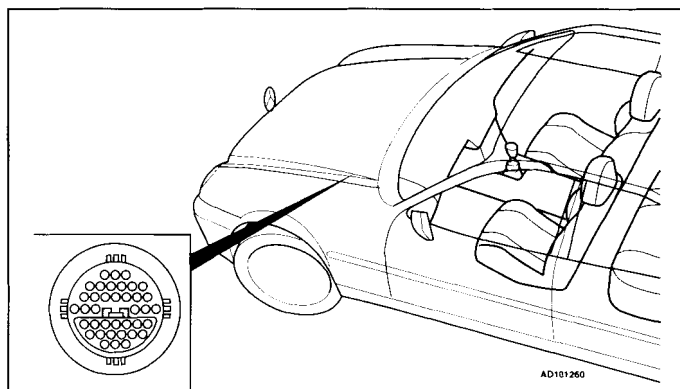
Year: 1995-04

Engine code: 104.941/943/944/991/994, 111.921, 111.942/943/944/945/946/947, 111.951/952/955/956/958/957, 111.973/974/975, 111.983, 112.910/911/912/914, 112.920/921, 112.940/941/946/947, 113.940/943/961/963, 119.980/981/982/985, 120.982/983

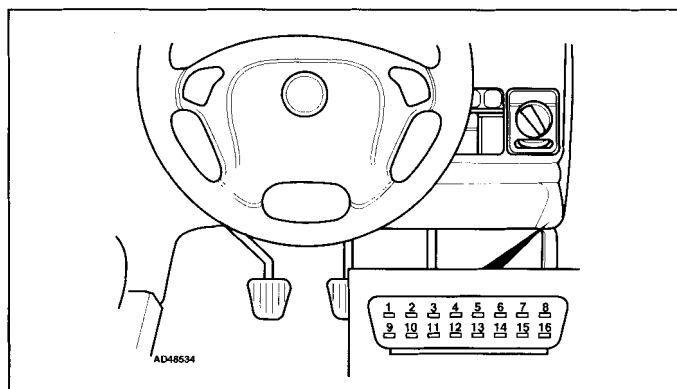
System: Bosch ME 1.0/2.0/2.1/2.8 • Bosch ME SIM4

## Engine management

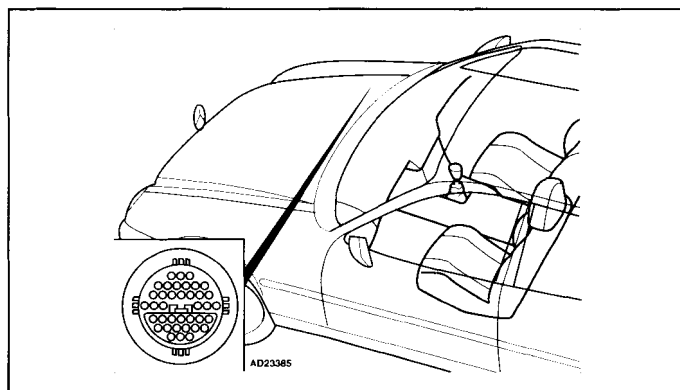
### Data link connector (DLC) locations



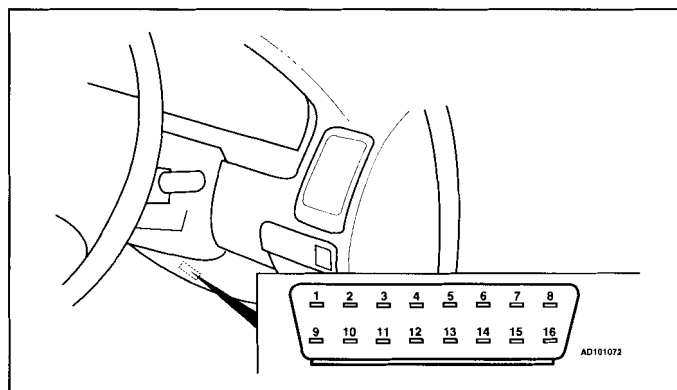
38-pin – C-Class (202), CLK, S-Class, SL-Class (129), SLK (→2000)



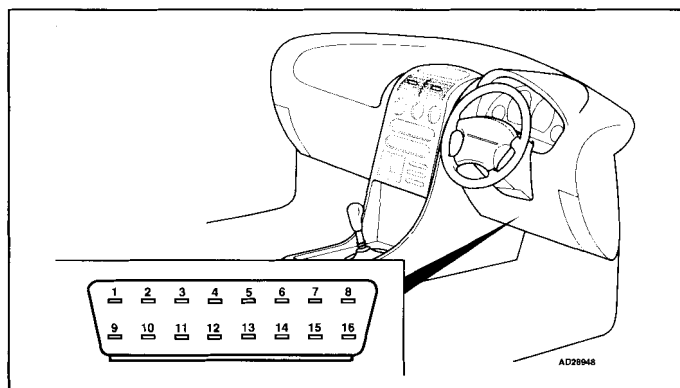
16-pin – E-Class (2000→), SL-Class (230)



38-pin – E-Class



16-pin – CLK (2000→)



16-pin – C-Class (203), SLK (2000→)

**Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

**Accessing and erasing**

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification**

EOBD type	Fault location	Probable cause
P0 1	Refer to EOBD trouble code table	–
P0801	Engine coolant blower motor/AC condenser blower motor – malfunction	Wiring, engine coolant blower motor/AC condenser blower motor
P0802	Intake manifold air control solenoid – malfunction	Wiring, intake manifold air control solenoid
P0803	Supercharger (SC) bypass valve motor – malfunction	Wiring, SC bypass valve motor, ECM
P0805	Supercharger (SC) pressure – incorrect	Supercharger (SC) bypass valve motor sticking, intake leak/blockage, SC, ECM
P0806	Supercharger (SC) clutch – malfunction	Wiring, SC clutch, ECM
P0809	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – signal incompatibility	Incorrect valve timing
P0811	CAN data bus, ignition switch control module – malfunction	Wiring, ignition switch control module, ECM
P1031	Heated oxygen sensor (HO2S) 1 – malfunction	Wiring, connector, HO2S
P1146	Mass air flow (MAF) sensor(s) – malfunction	Wiring, intake leak, MAF sensor(s)
P1147	Engine coolant temperature (ECT) sensor(s) – malfunction	Wiring, ECT sensor(s)
P1148	Intake air temperature (IAT) sensor(s) – malfunction	Wiring, IAT sensor(s)
P1149	Manifold absolute pressure (MAP) sensor(s) – malfunction	Wiring, hose(s), MAP sensor(s), ECM
P1162	Throttle position (TP) sensor(s) – malfunction	Wiring, TP sensor(s)
P1163	Engine oil level switch – malfunction	Wiring, engine oil level switch, ECM
P1177	Engine oil sensor, quality/level/temperature – malfunction	Wiring, engine oil sensor
P1178	Engine oil sensor, level – implausible signal	Wiring, oil level, engine oil sensor
P1179	Engine oil sensor, quality – implausible signal	Wiring, engine oil sensor
P1180	Engine oil sensor, temperature – too high	Wiring, engine oil sensor
P1181	Engine coolant blower motor/AC condenser blower motor – malfunction	Wiring, engine coolant blower motor/AC condenser blower motor, ECM
P1182	Starter motor relay – defective	Wiring, starter motor relay, ignition switch, ECM
P1183	Cylinder cut-out solenoid, bank 1 – defective	Wiring, cylinder cut-out solenoid
P1184	Cylinder cut-out solenoid, bank 2 – defective	Wiring, cylinder cut-out solenoid
P1185	Engine oil sensor, quality – water in oil	Engine oil
P1186	Fuel shut-off – recognised	Wiring, cruise control actuator, mechanical fault, ECM
P1225	Intake manifold air control solenoid – malfunction	Wiring, intake manifold air control solenoid, ECM
P1233	Throttle actuator – mechanical fault	Throttle actuator tight/sticking

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Engine management


EOBD type	Fault location	Probable cause
P1235	Supercharger (SC) pressure – incorrect	Supercharger (SC) bypass valve motor sticking, intake leak/blockage, SC, ECM
P1236	Supercharger (SC) clutch – malfunction	Wiring, SC clutch, ECM
P1300	Crankshaft position (CKP) sensor(s) – malfunction	Wiring, flywheel ring gear damaged, CKP sensor(s)
P1355	Cylinder cut-out solenoid, bank 1 – stuck open	Wiring, cylinder cut-out solenoid
P1356	Cylinder cut-out solenoid, bank 2 – stuck open	Wiring, cylinder cut-out solenoid
P1357	Cylinder cut-out system ON, cylinder 2, 3, 5 or 8 – inlet valve still opening	Mechanical fault
P1358	Cylinder cut-out system OFF, cylinder 5 – exhaust valve not opening	Mechanical fault
P1359	Cylinder cut-out system OFF, cylinder 2 – exhaust valve not opening	Mechanical fault
P1360	Cylinder cut-out system OFF, cylinder 3 – exhaust valve not opening	Mechanical fault
P1361	Cylinder cut-out system OFF, cylinder 8 – exhaust valve not opening	Mechanical fault
P1366	Cylinder cut-out system, throttle switchover valve – malfunction	Wiring, throttle switchover valve
P1380	Cylinder cut-out system OFF – one inlet valve of a cylinder is not opening	Mechanical fault
P1384	Knock sensor (KS) 1, bank 2 – malfunction	Wiring, KS
P1385	Knock sensor (KS) 2, bank 2 – malfunction	Wiring, KS
P1386	Engine control module (ECM), knock control – defective	Fuel contamination, mechanical fault, ECM
P1386	Engine control module (ECM), bank 1, knock control – defective	Fuel contamination, mechanical fault, ECM
P1397	Camshaft position (CMP) sensor(s) – malfunction	Wiring, CMP sensor(s)
P1400	Exhaust gas recirculation (EGR) solenoid – circuit malfunction	Wiring, EGR solenoid, hose(s), ECM
P1420	Secondary air injection (AIR) valve/solenoid – defective	Wiring, fuse, AIR valve/solenoid, ECM
P1437	Catalytic converter temperature sensor, bank 1 – defective	Wiring, catalytic converter temperature sensor, ECM
P1443	Evaporative emission (EVAP) canister purge valve(s) – defective	Wiring, hoses, EVAP canister purge valve(s)
P1444	Catalytic converter temperature sensor, bank 2 – defective	Wiring, catalytic converter temperature sensor, ECM
P1453	Secondary air injection (AIR) pump relay – defective	Wiring, fuse, AIR pump relay, ECM
P1463	Secondary air injection (AIR) system – defective	Wiring, hoses, AIR pump relay, AIR valve/solenoid
P1490	Evaporative emission (EVAP) canister purge valve(s) – defective	Wiring, hoses, EVAP canister purge valve(s)
P1491	AC system – pressure too high	AC control module trouble code(s) stored
P1519	Camshaft position (CMP) control, bank 1 – mechanical fault	Camshaft position control system
P1522	Camshaft position (CMP) control, bank 2 – mechanical fault	Camshaft position control system
P1525	Camshaft position (CMP) actuator, bank 1 – defective	Wiring, CMP actuator, ECM

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Model: C180/200/200K/230/230K/240/280 (202) • C180/200/200K/240/320 (203)  
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 CL420/500/600 (140) • SLK200/200K/230K/320 (170)  
 CLK200/200K/230K/320/430 (208) • SL280/320/500/600 (129) • SL500 (230)

**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1533	Camshaft position (CMP) actuator, bank 2 – defective	Wiring, CMP actuator, ECM
P1542	Accelerator pedal position (APP) sensor – signal	Wiring, APP sensor, ECM
P1551	AC compressor clutch shut-off	Wiring, incorrect AC control module, ECM
P1570	Ignition switch control module/ECM – attempted theft/ data bus/not compatible	Wiring, trouble code(s) stored in other system(s), ignition switch control module, ECM
P1580	Throttle motor, bank 1, TPM/ISC – circuit malfunction	Wiring, throttle motor, ECM
P1581	Throttle motor, bank 2, TPM/ISC – circuit malfunction	Wiring, throttle motor, ECM
P1584	Brake pedal position (BPP) switch – malfunction	Wiring, BPP switch, trouble code(s) stored in other system(s)
P1587	Engine control module (ECM), bank 1 & 2 – supply voltage	Wiring, connectors, ECM
P1588	CAN data bus, central locking control module – malfunction	Wiring
P1589	Engine control module (ECM), bank 2, knock control – defective	Fuel contamination, mechanical fault, ECM
P1603	CAN data bus, ignition switch control module – malfunction	Wiring
P1605	Acceleration sensor, ESP/ASR system – rough road signal, comparison of wheel speeds	Trouble code(s) stored in other system(s)
P1632	Engine control module (ECM), bank 2 – internal fault	ECM
P1641	Engine control module (ECM), bank 1 & 2 – TP signal	Wiring, ECM
P1642	Engine control module (ECM) – incorrectly coded	ECM coded for MT with AT fitted
P1643	Engine control module (ECM) – incorrectly coded/data bus	ECM coded for AT with MT fitted, wiring
P1644	Transmission control module (TCM) – supply voltage low	Wiring, TCM trouble code(s) stored
P1666	Cylinder cut-out solenoid, bank 1 or 2 – does not open	Wiring, cylinder cut-out solenoid
P1681	Engine control module (ECM), crash signal – plausibility	Wiring, connectors, SRS control module trouble code(s) stored, ECM
P1747	CAN data bus, TCM/instrument panel – malfunction	Wiring, trouble code(s) stored in other system(s)

 Except those listed



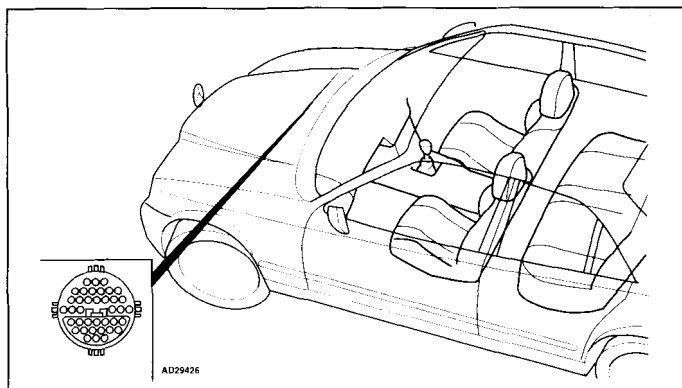
Model: C250 D  
 Year: 1993-94  
 Engine code: 605.910  
 System: Bosch EDC

**MERCEDES-BENZ**



Engine management

## Data link connector (DLC) locations



Engine bay – RH

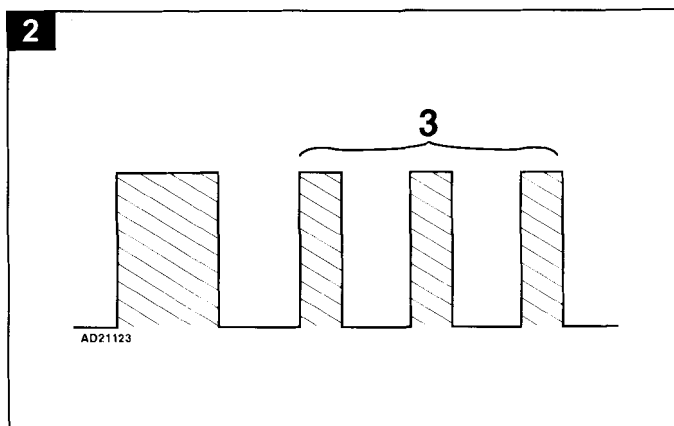
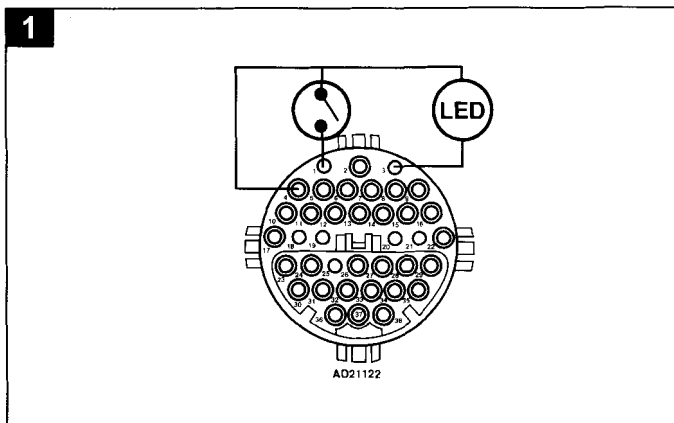
## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes can be accessed with diagnostic equipment connected to the data link connector (DLC).
- Flash codes can be displayed by using an LED connected to the data link connector (DLC).
- Diagnostic equipment can also be used to erase data from ECM fault memory.
- More detailed fault diagnosis information can be obtained using diagnostic equipment connected to the data link connector (DLC).

### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 1 and 4 with a switched lead **1**. Contacts normally open.
- Connect LED between data link connector (DLC) terminals 3 and 4.
- Switch ignition ON.
- Operate switch for 2-4 seconds.
- LED should illuminate for a few seconds before flashing.
- Count LED flashes. Note flash code.
- Individual short flashes display flash code.
- For example: Flash code 3 displayed **2**.
- To display remaining flash codes:
- Operate switch for 2-4 seconds at the end of each flash code. Note flash code and operate switch again.
- Switch ignition OFF. Rectify faults as necessary.



### Erasing

- After each flash code is displayed, operate switch for 5-6 seconds.
- Repeat procedure for each flash code.



## Engine management

## Trouble code identification

Trouble code	Flash type	Fault location	Probable cause
–	1	No fault found	–
002	30	Fuel temperature sensor	Wiring, fuel temperature sensor, ECM
003	2	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
004	13	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
005	4	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
006	31	Fuel quantity adjuster position sensor	Wiring, fuel quantity adjuster position sensor, ECM
008	32	Fuel quantity adjuster	Wiring, fuel quantity adjuster, ECM
009	19	ABS control module – vehicle speed signal	Wiring, ABS fault, ABS control module, ECM
010	18	Cruise control master switch – brake pedal position (BPP) switch	Wiring, cruise control master switch, BPP switch, ECM
011	26	Engine control module (ECM)	ECM
012	3	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
014	26	Engine control module (ECM)	ECM
016	6	Engine speed (RPM) sensor	Wiring, RPM sensor, ECM
017	5	Crankshaft position (CKP) sensor	Wiring, CKP sensor, ECM
018	16	Brake pedal position (BPP) switch	Wiring, BPP switch, ECM
021	20	Malfunction indicator lamp (MIL)/exhaust gas recirculation (EGR) solenoid/AT – cruise control switch-over valves	Wiring, hose leak/blockage, EGR valve, cruise control switch-over valves, ECM
022	26	Engine control module (ECM)	ECM
023	7	Supply voltage/overvoltage protection relay	Wiring, overvoltage protection relay, ECM
024	26	Engine control module (ECM)	ECM
025	8	Engine control module (ECM)	ECM
026	15	Clutch pedal position (CPP) switch	Wiring, CPP switch, ECM
026	15	Starter motor relay – AT	Wiring, starter motor relay, ECM
027	27	Not assigned	–
028	7	Engine control module (ECM) – supply voltage	Wiring, relay module, fuse, ignition switch, ECM
029	12	Supply voltage/holding voltage	Wiring, alternator, battery, overvoltage protection relay, ECM
031	29	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid, ECM





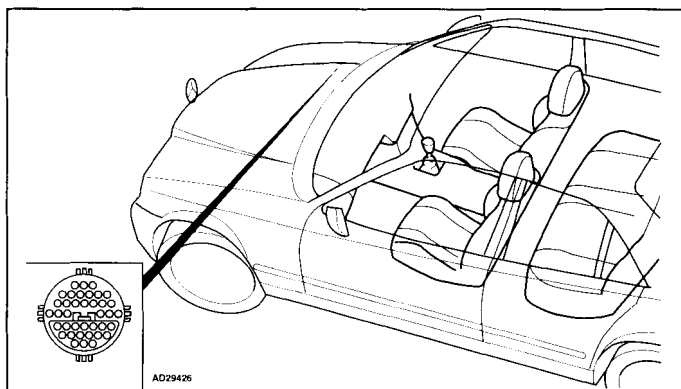
Model: C250 D • C250 TD  
 Year: 1994-96  
 Engine code: 605.910, 605.960  
 System: Bosch EDC  
 Trouble codes: Flash type

**MERCEDES-BENZ**



Engine management

## Data link connector (DLC) locations



Engine bay – RH

## Trouble codes

### General information

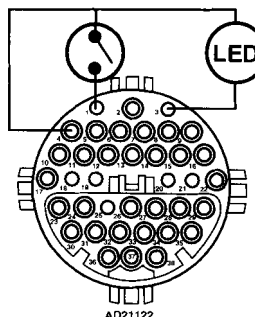
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes can be displayed by using an LED connected to the data link connector (DLC).
- The ECM fault memory can also be accessed and erased by using diagnostic equipment connected to the data link connector (DLC).

**NOTE:** *More detailed fault diagnosis information is obtained when using diagnostic equipment.*

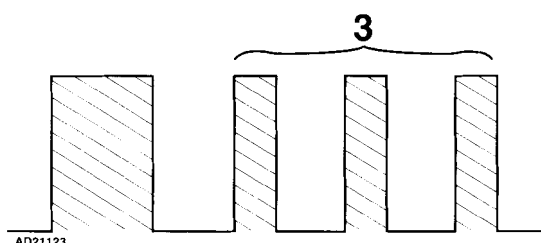
### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 1 and 4 with a switched lead (contacts normally open) **1**.
- Connect LED between data link connector (DLC) terminals 3 and 4.
- Switch ignition ON.
- Operate switch for 2-4 seconds.
- LED should illuminate for a few seconds before flashing.
- Count LED flashes. Note flash code.
- Individual short flashes display flash code.
- For example: Flash code 3 displayed **2**.
- To display remaining flash codes:
- Operate switch for 2-4 seconds at the end of each flash code. Note flash code and operate switch again.
- Switch ignition OFF. Rectify faults as necessary.

**1**



**2**



### Erasing

- After each flash code is displayed, operate switch for 5-6 seconds.
- Repeat procedure for each flash code.



## Engine management

## Trouble code identification

Flash type	Fault location	Probable cause
1	No fault found	
2	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
3	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
4	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
5	Crankshaft position (CKP) sensor	Wiring, CKP sensor, ECM
6	Engine speed (RPM) sensor	Wiring, RPM sensor, ECM
7	Supply voltage/overvoltage protection relay	Wiring, alternator, battery, overvoltage protection relay, ECM
8	Engine control module (ECM)	ECM
12	Supply voltage/holding voltage	Wiring, alternator, battery, overvoltage protection relay, ECM
13	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
15	Clutch pedal position (CPP) switch – MT	Wiring, CPP switch, ECM
15	Starter motor relay – AT	Wiring, starter motor relay, ignition switch
16	Brake pedal position (BPP) switch	Wiring, BPP switch, ECM
18	Cruise control master switch – brake pedal position (BPP) switch	Wiring, BPP switch, cruise control master switch, ECM
19	ABS control module – vehicle speed signal	Wiring, ABS control module, ECM
20	Malfunction indicator lamp (MIL)/exhaust gas recirculation (EGR) solenoid/AT – cruise control switch-over valves	Wiring, hose leak/blockage, EGR valve, cruise control switch-over valves, ECM
26	Engine control module (ECM)	ECM
27	Not assigned	
29	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid, ECM
30	Fuel temperature sensor	Wiring, fuel temperature sensor, ECM
31	Fuel quantity adjuster position sensor	Wiring, fuel quantity adjuster position sensor, ECM
32	Fuel quantity adjuster	Wiring, fuel quantity adjuster, ECM



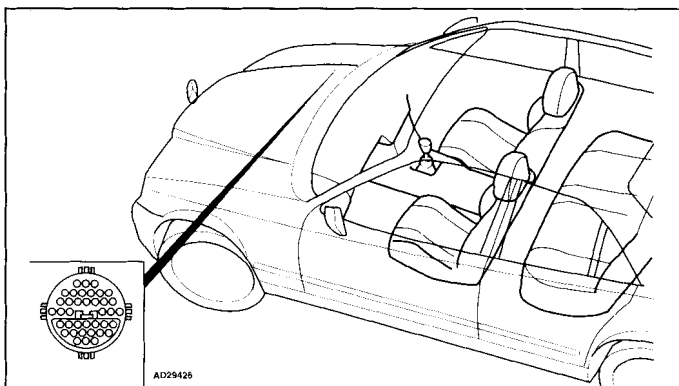
Model: C250 D • C250 TD  
Year: 1994-96  
Engine code: 605.910, 605.960  
System: Bosch EDC  
Trouble codes: P type

**MERCEDES-BENZ**



Engine management

## Data link connector (DLC) locations



Engine bay – RH

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes can also be displayed by using an LED connected to the data link connector (DLC).

**NOTE:** *More detailed fault diagnosis information is obtained when using diagnostic equipment.*

### Accessing and erasing

- The ECM fault memory can be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

P type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1105	Barometric pressure (BARO) sensor	ECM
P1220	Fuel quantity adjuster	Wiring, fuel quantity adjuster
P1222	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
P1223	Fuel quantity adjuster position sensor	Wiring, fuel quantity adjuster, ECM
P1335	Crankshaft position (CKP) sensor	Wiring, CKP sensor, ECM
P1465	Turbocharger (TC) wastegate regulating valve	Wiring, TC wastegate regulating valve, ECM
P1470	Exhaust gas recirculation (EGR) throttle control valve	Wiring, EGR throttle control valve, ECM



## Engine management

P type	Fault location	Probable cause
P1520	Cruise control master switch	Wiring, cruise control master switch, ECM
P1610	Relay module	Wiring, relay module, ECM
P1611	Engine control module (ECM)	ECM
P1612	Engine control module (ECM) – supply voltage	Wiring, relay module, fuse
P1613	Engine control module (ECM)	ECM
P1614	Engine control module (ECM), fuel quantity calculation	ECM
P1615	Engine control module (ECM) – supply voltage	Wiring, alternator, battery, ECM
P1617	Engine control module (ECM) – not coded	ECM not coded
P1622	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid, ECM
P1625	Instrument panel – MIL	Wiring, bulb, instrument panel, ECM
P1630	Immobilizer control module – wiring, communication failure	Wiring, immobilizer control module, ECM
P1631	Traction control module – wheel spin detection	Wiring, ECM, traction control module
P1705	Clutch pedal position (CPP) switch	Wiring, CPP switch, ECM
P1780	Cruise control, automatic transmission	Wiring, BPP switch, cruise control master switch
P1781	Cruise control, automatic transmission	Wiring, BPP switch, cruise control master switch



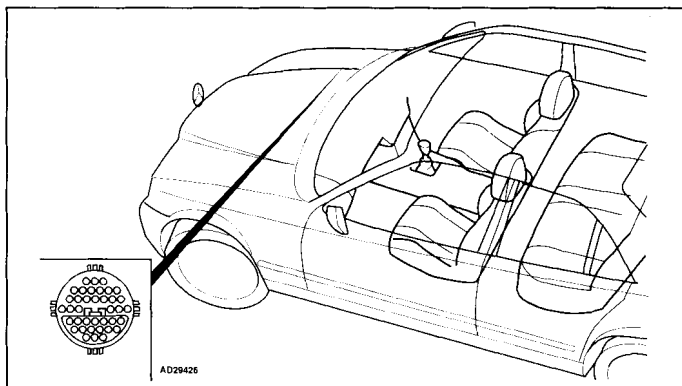
Model: C250 TD  
 Year: 1996-99  
 Engine code: 605.960  
 System: Bosch EDC

**MERCEDES-BENZ**



Engine management

## Data link connector (DLC) locations



Engine bay – RH

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- The ECM fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

P type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1105	Barometric pressure (BARO) sensor – in engine control module (ECM)	ECM
P1220	Fuel quantity adjuster	
P1221	Data bus – acceleration skid control	Wiring, traction control module, ECM
P1222	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
P1223	Fuel quantity adjuster position sensor	Wiring, fuel quantity adjuster, ECM
P1330	Starter protection	Wiring
P1335	Crankshaft position (CKP) sensor	Wiring, CKP sensor, mechanical fault, ECM
P1402	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid, ECM



## Engine management

P type	Fault location	Probable cause
P1403	Exhaust gas recirculation (EGR) solenoid/exhaust gas recirculation (EGR) control valve	Wiring, EGR control valve, hose leak/blockage, mechanical fault, ECM
P1470	Turbocharger (TC) wastegate regulating valve	Wiring, EGR control valve, hose leak/blockage, mechanical fault, ECM
P1480	Glow plug warning lamp	Wiring, glow plugs, warning lamp, ECM
P1481	Glow plugs	Wiring, glow plug control module, ECM
P1482	Glow plug control module	Wiring, glow plug control module, ECM
P1515	Maximum speed limit	Maximum speed exceeded
P1520	Cruise control master switch	Wiring, cruise control master switch, ECM
P1610	Relay module	Wiring, relay module, ECM
P1611	Engine control module (ECM)	ECM
P1612	Engine control module (ECM) – supply voltage	Wiring, relay module, fuse
P1613	Engine control module (ECM)	ECM
P1614	Engine control module (ECM), fuel quantity calculation	ECM
P1615	Engine control module (ECM) – supply voltage	Wiring
P1617	Engine control module (ECM) – not coded	ECM not coded
P1622	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid, ECM
P1630	Immobilizer control module – communication failure	Wiring, immobilizer control module, ECM
P1705	Clutch pedal position (CPP) switch	Wiring, CPP switch, ECM



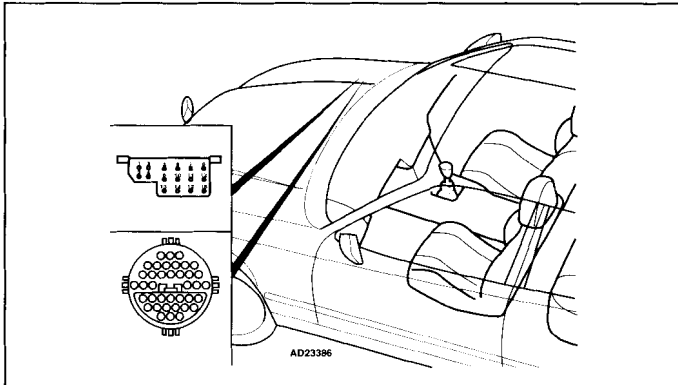
Model: C-Class (202) • E-Class (124) • E-Class (210)  
S-Class (140) • SL (129) • SLK (170)  
Year: 1993-02

**MERCEDES-BENZ**

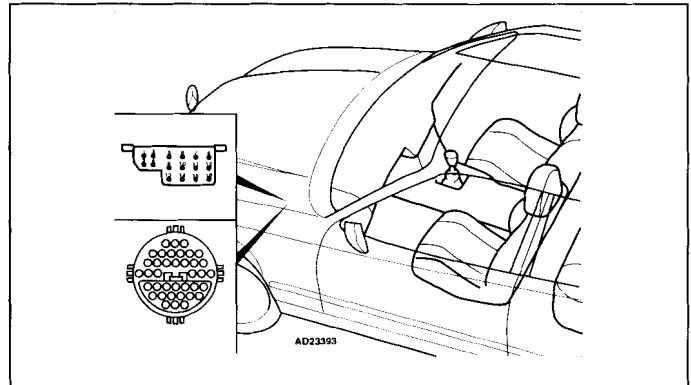


Transmission

## Data link connector (DLC) locations



C-Class, E-Class (124), S-Class, SL, SLK – RH engine bay



E-Class (210) – LH engine bay

## Trouble codes

### General information

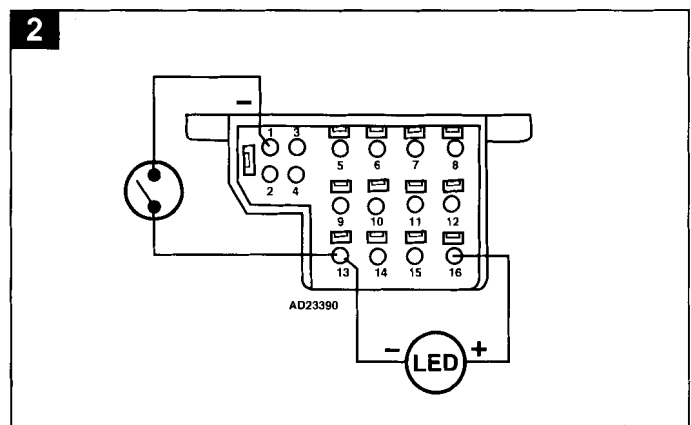
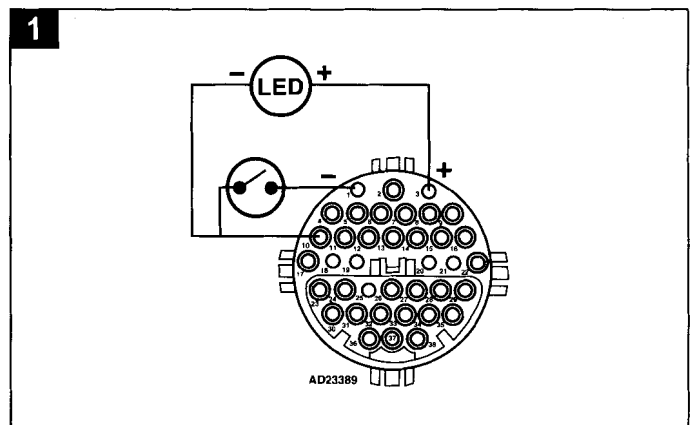
- ❑ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ❑ Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- ❑ The TCM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).
- ❑ Diagnostic equipment can also be used to erase data from TCM fault memory.
- ❑ More detailed fault diagnosis information can be obtained using diagnostic equipment connected to the data link connector (DLC).

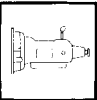
### Accessing – flash type

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 1 and 10 or 1 and 13 with a switched lead – contacts normally open **1** or **2**.
- Connect LED test lamp between terminals 3 and 10 or 13 and 16 **1** or **2**.

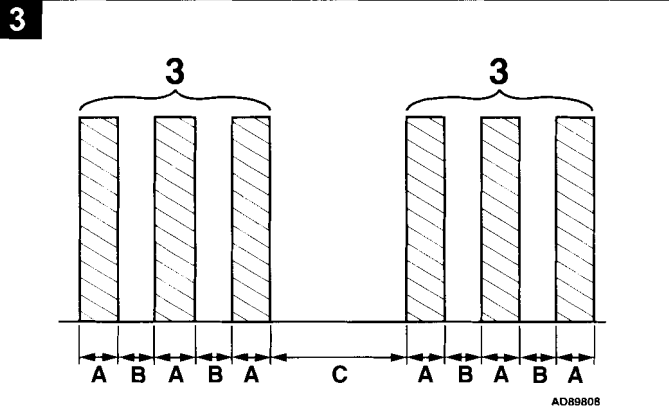
**NOTE:** Connect LED test lamp positive connection to terminal 3 or 16.

- Switch ignition ON.
- Operate switch for 2-4 seconds.
- Count LED flashes. Note trouble code.
- Trouble codes consist of short flashes **3**.
- For example: Trouble code 3 displayed **3**.
- Repeat operation. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.





## Transmission



### Erasing – flash type

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 1 and 10 or 1 and 13 with a switched lead – contacts normally open **1** or **2**.
- Connect LED test lamp between terminals 3 and 10 or 13 and 16 **1** or **2**.

**NOTE:** Connect LED test lamp positive connection to terminal 3 or 16.

- Switch ignition ON.
- Operate switch for 2-4 seconds.
- Allow LED to display trouble code.
- Wait 3 seconds.
- Operate switch for 6-8 seconds.
- Repeat operation to erase all stored trouble codes.

### Trouble code identification

Flash type	Fault location	Probable cause
1	No fault found	–
2	Engine control module (ECM)/transmission control module (TCM) – incorrectly coded	ECM incorrectly coded, ECM trouble code(s) stored
3	Transmission control module (TCM) – load signal/range/performance problem	Wiring, trouble code(s) stored in other system(s), TCM, ECM
4	Accelerator pedal position (APP) sensor – signal	Wiring, APP sensor, TP switch/sensor, TCM
4 <b>1</b>	CAN data bus, ETS – malfunction	Wiring, trouble code(s) stored in other system(s), ETS control module
5	Transmission control module (TCM) – RPM signal	Wiring, ECM control module trouble code(s) stored, TCM, ECM
5 <b>1</b>	CAN data bus, TCM/ECM – malfunction	Wiring, trouble code(s) stored in other system(s), TCM, ECM
6	Transmission control module (TCM) – VSS signal	Wiring, VSS, instrument panel, multifunction relay
6 <b>1</b>	CAN data bus – malfunction	Wiring, trouble code(s) stored in other system(s)
7	Transmission control module (TCM) – output stage	Wiring, transmission valve block, APP sensor, TP switch/sensor, TCM, ECM
7 <b>1</b>	Shift solenoid (SS) 4 – malfunction	Wiring, SS, TCM
8	Transmission control module (TCM) – internal fault	TCM
9 <b>■</b>	Transmission valve block – malfunction	Wiring, transmission valve block, shift solenoid (SS), TCM
10	Transmission valve block – electrical fault	Wiring, connector, transmission valve block, shift solenoid (SS), TCM

**1** E-Class (124), SL with HFM, S-Class

**2** E-Class (124), SL with HFM, S-Class: Trouble code could be indicated due to repair work. Erase code and run engine for approximately 10 seconds with 1000 rpm minimum. If the trouble code is displayed again the fault still exists.





### Accessing and erasing – scanner type

- The transmission control module (TCM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

- Trouble code: 002-065 – permanent faults
- Trouble code: 098-155 – intermittent faults

Scanner type	Fault location	Probable cause
002	Shift solenoid (SS) 1 & 2/4 & 5 – defective	Wiring, SS
002 <b>1</b>	Engine control module (ECM)/transmission control module (TCM) – incorrectly coded	ECM incorrectly coded, ECM trouble code(s) stored
003	Shift solenoid (SS) 2 & 3 – defective	Wiring, SS
003 <b>1</b>	Transmission control system – range/performance problem	Wiring, trouble code(s) stored in other system(s)
004	Shift solenoid (SS) 3 & 4 – defective	Wiring, SS
004 <b>1</b>	CAN data bus, ETS – malfunction	Wiring, trouble code(s) stored in other system(s)
005	Torque converter clutch (TCC) solenoid – defective	Wiring, TCC solenoid
005 <b>1</b>	CAN data bus, ECM – malfunction	Wiring, ECM trouble code(s) stored
006	Pressure control (PC) solenoid – defective	Wiring, TFP solenoid
006 <b>1</b>	CAN data bus – malfunction	Wiring, trouble code(s) stored in other system(s)
007	Pressure control (PC) solenoid, shift pressure – defective	Wiring, TFP solenoid
007 <b>1</b>	Shift solenoid (SS) 4 – malfunction	Wiring, SS, TCM
008	Transmission park position interlock solenoid – defective	Wiring, transmission park position interlock solenoid
008 <b>1</b>	Transmission control module (TCM) – internal fault	TCM
009	Starter motor relay – defective	Starter motor relay
009 <b>2</b>	Shift solenoid (SS) 4 – defective	Wiring, SS, TCM
010	Transmission valve block – supply voltage	Wiring, TCM
010 <b>1</b>	Shift solenoid (SS) 4 – short circuit	Wiring, SS, TCM
011	Transmission speed sensor(s) – supply voltage	Wiring, TCM
012	Input shaft speed (ISS) sensor/turbine shaft speed (TSS) sensor 1 – circuit malfunction	Wiring, connectors, ISS sensor/TSS sensor
013	Input shaft speed (ISS) sensor/turbine shaft speed (TSS) sensor 2 – circuit malfunction	Wiring, connectors, ISS sensor/TSS sensor
018	Transmission range (TR) switch – plausibility	Wiring, connectors, TR switch
020	Starter motor relay/transmission fluid temperature (TFT) sensor – defective	Wiring, connectors, TR switch, starter motor relay, transmission fluid temperature (TFT) sensor
021	Transmission control module (TCM) – supply voltage	Wiring, connectors
022	CAN data bus, RH rear wheel speed signal – plausibility	Wiring, trouble code(s) stored in other system(s)
023	CAN data bus, LH rear wheel speed signal – plausibility	Wiring, trouble code(s) stored in other system(s)
024	CAN data bus, RH front wheel speed signal – plausibility	Wiring, trouble code(s) stored in other system(s)
025	CAN data bus, LH front wheel speed signal – plausibility	Wiring, trouble code(s) stored in other system(s)
026	CAN data bus, APP sensor – plausibility	Wiring, APP sensor, trouble code(s) stored in other system(s)



**Transmission**

Scanner type	Fault location	Probable cause
027	CAN data bus, engine torque – plausibility	Wiring, trouble code(s) stored in other system(s)
028	CAN data bus, RPM signal – plausibility	Wiring, trouble code(s) stored in other system(s)
029	CAN data bus, engine torque – plausibility	Wiring, trouble code(s) stored in other system(s)
030	CAN data bus, ECM – plausibility	Wiring, ECM trouble code(s) stored
031	CAN data bus, engine torque/speed – plausibility	Wiring, trouble code(s) stored in other system(s)
033	CAN data bus, ECM – plausibility	Wiring, ECM trouble code(s) stored
036	CAN data bus, ECM/ECT – electrical interference/plausibility	Wiring, ECM trouble code(s) stored
037	CAN data bus – electrical interference	Wiring, trouble code(s) stored in other system(s)
038	CAN data bus, ESP – electrical interference	Wiring, trouble code(s) stored in other system(s)
039	CAN data bus, ECM – electrical interference	Wiring, ECM trouble code(s) stored
040	CAN data bus – electrical interference	Wiring, trouble code(s) stored in other system(s)
051	Transmission control system – malfunction	Wiring, mechanical fault, shift solenoids, transmission valve block, transmission fluid level, TCM
052	Transmission shift control valve – sticking	AT mechanical fault, transmission valve block, transmission shift control valve
053	Torque converter clutch (TCC) – defective	Torque converter
054	CAN data bus, TCM/input signal – malfunction	Wiring
055	Transmission control module (TCM), gear shift – malfunction	Wiring, mechanical fault, shift solenoids, transmission valve block, transmission fluid level, TCM
056	Transmission control module (TCM) – internal fault	Wiring, connectors, TCM
057	Transmission control module (TCM) – internal fault	Wiring, connectors, TCM
058	Transmission control module (TCM) – internal fault	Wiring, connectors, TCM
059	Transmission control module (TCM) – internal fault	Wiring, connectors, TCM
060	Transmission control module (TCM) – internal fault	Wiring, connectors, TCM
061	Transmission control module (TCM) – internal fault	Wiring, connectors, TCM
062	Transmission control module (TCM) – internal fault	Wiring, connectors, TCM
063	Transmission control module (TCM) – internal fault	Wiring, connectors, TCM
064	Transmission control module (TCM) – internal fault	Wiring, connectors, TCM
065	Transmission control module (TCM) – internal fault	Wiring, connectors, TCM
098	Shift solenoid (SS) 1 & 2/4 & 5 – defective	Wiring, SS
099	Shift solenoid (SS) 2 & 3 – defective	Wiring, SS
100	Shift solenoid (SS) 3 & 4 – defective	Wiring, SS
101	Torque converter clutch (TCC) solenoid – defective	Wiring, TCC solenoid
102	Pressure control (PC) solenoid – defective	Wiring, TFP solenoid
103	Pressure control (PC) solenoid, shift pressure – defective	Wiring, TFP solenoid
104	Transmission park position interlock solenoid – defective	Wiring, transmission park position interlock solenoid
105	Starter motor relay – defective	Starter motor relay
106	Transmission valve block – supply voltage	Wiring, TCM
107	Transmission speed sensor(s) – supply voltage	Wiring, TCM



Scanner type	Fault location	Probable cause
108	Input shaft speed (ISS) sensor/turbine shaft speed (TSS) sensor 1 – circuit malfunction	Wiring, connectors, ISS sensor/TSS sensor
109	Input shaft speed (ISS) sensor/turbine shaft speed (TSS) sensor 2 – circuit malfunction	Wiring, connectors, ISS sensor/TSS sensor
114	Transmission range (TR) switch – plausibility	Wiring, connectors, TR switch
116	Starter motor relay/transmission fluid temperature (TFT) sensor – defective	Wiring, connectors, TR switch, starter motor relay, transmission fluid temperature (TFT) sensor
117	Transmission control module (TCM) – supply voltage	Wiring, connectors
118	CAN data bus, RH rear wheel speed signal – plausibility	Wiring, trouble code(s) stored in other system(s)
119	CAN data bus, LH rear wheel speed signal – plausibility	Wiring, trouble code(s) stored in other system(s)
120	CAN data bus, RH front wheel speed signal – plausibility	Wiring, trouble code(s) stored in other system(s)
121	CAN data bus, LH front wheel speed signal – plausibility	Wiring, trouble code(s) stored in other system(s)
122	CAN data bus, APP sensor – plausibility	Wiring, APP sensor, trouble code(s) stored in other system(s)
124	CAN data bus, RPM signal – plausibility	Wiring, trouble code(s) stored in other system(s)
125	CAN data bus, engine torque – plausibility	Wiring, trouble code(s) stored in other system(s)
126	CAN data bus, ECM – plausibility	Wiring, ECM trouble code(s) stored
127	CAN data bus, engine torque/speed – plausibility	Wiring, trouble code(s) stored in other system(s)
129	CAN data bus, ECM – plausibility	Wiring, ECM trouble code(s) stored
132	CAN data bus, ECM/ECT – electrical interference/plausibility	Wiring, ECM trouble code(s) stored
133	CAN data bus – electrical interference	Wiring, trouble code(s) stored in other system(s)
134	CAN data bus, ESP – electrical interference	Wiring, trouble code(s) stored in other system(s)
135	CAN data bus, ECM – electrical interference	Wiring, ECM trouble code(s) stored
147	Transmission control system – malfunction	Wiring, mechanical fault, shift solenoids, transmission valve block, transmission fluid level, TCM
148	Transmission shift control valve – sticking	AT mechanical fault, transmission valve block, transmission shift control valve
149	Torque converter clutch (TCC) – defective	Torque converter
150	CAN data bus, TCM/input signal – malfunction	Wiring
151	Transmission control module (TCM), gear shift – malfunction	Wiring, mechanical fault, shift solenoids, transmission valve block, transmission fluid level, TCM
152	Transmission control module (TCM) – internal fault	Wiring, connectors, TCM
153	Transmission control module (TCM) – internal fault	Wiring, connectors, TCM
154	Transmission control module (TCM) – internal fault	Wiring, connectors, TCM
155	Transmission control module (TCM) – internal fault	Wiring, connectors, TCM

❶ E-Class (124), SL with HFM, S-Class, E-Class (210)

❷ E-Class (124), SL with HFM, S-Class, E-Class (210): Trouble code could be indicated due to repair work. Erase code and run engine for approximately 10 seconds with 1000 rpm minimum. If the trouble code is displayed again the fault still exists.

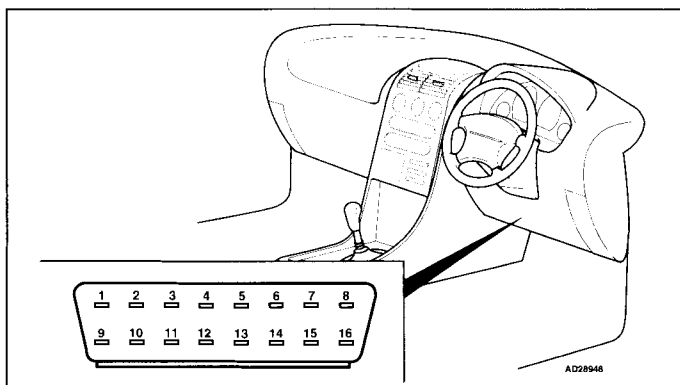


**MINI**

Model: One • Cooper  
Year: 2001-04  
Engine code: W10B, W11B  
System: Siemens EMS 2000

## Engine management

### Data link connector (DLC) locations



Under steering column

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

EOBD type	BMW type	Fault location	Probable cause
P0	–	Refer to EOBD trouble code table	–
P1106	4358	Manifold absolute pressure (MAP) sensor – signal too low at engine stop	Wiring short to earth, poor connection, sensor supply, MAP sensor
P1107	4359	Manifold absolute pressure (MAP) sensor – signal too low at idle	Wiring short to earth, poor connection, MAP sensor
P1108	4360	Manifold absolute pressure (MAP) sensor – signal too low at full load for low engine speed	Wiring short to earth, MAP sensor
P1109	4361	Manifold absolute pressure – too high under deceleration	Throttle valve sticking, air leak
P1122	4386	Accelerator pedal position (APP) sensor 1 – low input	Wiring short to earth, APP sensor
P1123	4387	Accelerator pedal position (APP) sensor 1 – high input	Wiring short to positive, APP sensor
P1125	4389	Throttle position (TP) sensor, A/B – small range/performance problem	Wiring, TP sensor



EOBD type	BMW type	Fault location	Probable cause
P1126	4390	Throttle position (TP) sensor, A/B – large range/performance problem	Wiring, TP sensor
P1143	4419	Heated oxygen sensor (HO2S) 2, bank 1 – signal too high	Wiring short to positive, catalytic converter, fuel pressure high, HO2S
P1144	4420	Heated oxygen sensor (HO2S) 2, bank 1 – signal too low	Wiring short to earth, poor connection, exhaust leak, fuel pressure low, HO2S
P1222	4642	Accelerator pedal position (APP) sensor 2 – low input	Wiring short to earth, APP sensor
P1223	4643	Accelerator pedal position (APP) sensor 2 – high input	Wiring short to positive, APP sensor
P1224	4644	Accelerator pedal position (APP) sensor 1/2 – range/performance problem	Wiring, APP sensor
P1226	4646	Electronic throttle system (ETS) – malfunction	Throttle valve tight/sticking, ETS
P1229	4649	Throttle position (TP) sensor – adaptation failure	ETS
P1234	4660	Fuel pump (FP) relay, primary circuit – low	Wiring open circuit/short to earth, fuel pump relay
P1236	4662	Fuel pump (FP) relay, primary circuit – high	Wiring short to positive, fuel pump relay
P1237	4663	Manifold absolute pressure (MAP) sensor 2 – low input	Wiring short to earth, MAP sensor
P1238	4664	Manifold absolute pressure (MAP) sensor 2 – high input	Wiring short to positive, MAP sensor
P1239	4665	Manifold absolute pressure (MAP) sensor 2 – signal too low at engine stop	Wiring short to earth, poor connection, sensor supply, MAP sensor
P1240	4672	Manifold absolute pressure (MAP) sensor 2 – signal too low at idle	Wiring short to earth, poor connection, MAP sensor
P1241	4673	Manifold absolute pressure (MAP) sensor 2 – signal too low at full load for low engine speed	Wiring short to earth, MAP sensor
P1242	4674	Manifold absolute pressure (MAP) sensor 2 – too high in deceleration	Throttle valve sticking, air leak
P1320	4896	Flywheel adaptation for misfire detection – range	–
P1321	4897	Flywheel adaptation for misfire detection – performance	–
P1366	4966	Ignition coil A, primary/secondary circuit – low	Wiring short to earth, ignition coil
P1367	4967	Ignition coil B, primary/secondary circuit – low	Wiring short to earth, ignition coil
P1570	5488	Engine control module (ECM), sensor supply circuit A – low output	Wiring short to earth, ECM
P1571	5489	Engine control module (ECM), sensor supply circuit A – high output	Wiring short to positive, ECM
P1572	5490	Engine control module (ECM), sensor supply circuit A – noisy signal	Wiring, interference
P1573	5491	Engine control module (ECM), sensor supply circuit B – low output	Wiring short to earth, ECM
P1574	5492	Engine control module (ECM), sensor supply circuit B – high output	Wiring short to positive, ECM



**MINI**

Model: One • Cooper

**Engine management**

<b>EOBD type</b>	<b>BMW type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1575	5493	Engine control module (ECM), sensor supply circuit B – noisy signal	Wiring, interference
P1600	5632	Engine control module (ECM) – external access RAM error	–
P1607	5639	CAN data bus version	Programming
P1612	5650	CAN data bus, instrument panel	Wiring, instrument panel
P1613	5651	CAN data bus, automatic stability control (ASC) system	Wiring, ASC
P1615	5653	Engine control module (ECM) processor – SPI-bus failure	ECM
P1616	5654	Engine control module (ECM) coding memory – check sum error	ECM
P1617	5655	Engine control module (ECM) H bridge controller	ECM
P1679	5753	Electronic throttle control monitor level 2/3 – torque loss calculation	ECM
P1680	5760	Electronic throttle control monitor level 2/3 – ADC processor fault	ECM
P1681	5761	Electronic throttle control monitor level 2/3 – engine speed calculation error	ECM
P1682	5762	Electronic throttle control monitor level 2/3 – idle speed 'a' calculation fault	ECM
P1683	5763	Electronic throttle control monitor level 2/3 – idle speed 'b' calculation fault	ECM
P1684	5764	Electronic throttle control monitor level 2/3 – clutch torque min error	ECM
P1685	5765	Electronic throttle control monitor level 2/3 – clutch torque max error	ECM
P1686	5766	Electronic throttle control monitor level 2/3 – APP sensor diagnostic error	ECM
P1687	5767	Electronic throttle control monitor level 2/3 – TP sensor diagnostic error	ECM
P1688	5768	Electronic throttle control monitor level 2/3 – MAF calculation	ECM
P1689	5769	Electronic throttle control monitor level 2/3 – torque calculation error	ECM
P1691	5777	Electronic throttle control monitor level 2/3 – motorised throttle control engine speed limitation error	ECM
P1692	5778	Electronic throttle control monitor level 2/3 – motorised throttle control and fuel injection switch off A	ECM
P1693	5779	Electronic throttle control monitor level 2/3 – motorised throttle control and fuel injection switch off B	ECM
P1696	5782	Engine control (EC) relay, control circuit – low input	Wiring short to earth, EC relay, ECM
P1697	5783	Engine control (EC) relay, control circuit – high input	Wiring short to positive, EC relay, ECM



EOBD type	BMW type	Fault location	Probable cause
–	8482	Accelerator pedal position (APP) sensor/switch D – input low	Wiring, APP sensor/switch
–	8482	Throttle position (TP) sensor/switch D – input low	Wiring, TP sensor/switch
–	8483	Accelerator pedal position (APP) sensor/switch D – input high	Wiring, APP sensor/switch
–	8483	Throttle position (TP) sensor/switch D – input high	Wiring, TP sensor/switch
–	8487	Accelerator pedal position (APP) sensor/switch E – input low	Wiring, APP sensor/switch
–	8487	Throttle position (TP) sensor/switch E – input low	Wiring, TP sensor/switch
–	8488	Accelerator pedal position (APP) sensor/switch E circuit – input high	Wiring, APP sensor/switch
–	8488	Throttle position (TP) sensor/switch E circuit – input high	Wiring, TP sensor/switch
–	8504	Accelerator pedal position (APP) sensor/switch D/E – voltage correlation	Wiring, APP sensor/switch
–	8504	Throttle position (TP) sensor/switch D/E – voltage correlation	Wiring, TP sensor/switch
–	8816	Heated oxygen sensor (HO2S) 2, bank 1 – stuck lean	Wiring short to earth, exhaust leak, fuel pressure low, HO2S, injectors, intake leak
–	8817	Heated oxygen sensor (HO2S) 2, bank 1 – stuck rich	Wiring short to positive, catalytic converter, HO2S, fuel pressure high, injectors, intake restricted
–	8960	Ignition coil A – primary circuit – voltage low	Wiring short to earth, ignition coil
–	8961	Ignition coil A – primary circuit – voltage high	Wiring short to positive, ignition coil
–	8963	Ignition coil B – primary circuit – voltage low	Wiring short to earth, ignition coil
–	8964	Ignition coil B – primary circuit – voltage high	Wiring short to positive, ignition coil

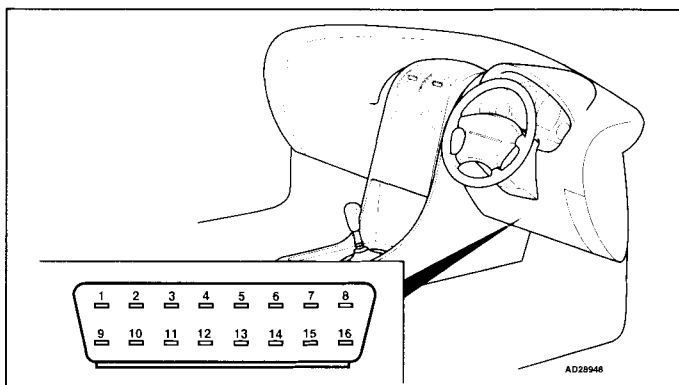


**MINI**

Model: One D  
Year: 2002-04  
Engine code: W17B  
System: DDE4

## Engine management

### Data link connector (DLC) locations



Under steering column

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

EOBD type	BMW type	Fault location	Probable cause
P0	–	Refer to EOBD trouble code table	–
P1212	17669	Exhaust gas recirculation (EGR) valve actuator – circuit high	Wiring short to positive, EGR valve actuator
–	17344	Exhaust gas recirculation (EGR) throttle control valve – voltage low/high	Wiring, EGR throttle control valve
–	16480	Barometric pressure (BARO) sensor – voltage low/high	Wiring, BARO sensor
P3000	19996	Fuel rail pressure (FRP) sensor – maximum offset exceeded	Wiring, FRP sensor, FRP control valve
P3001	19996	Fuel rail pressure (FRP) sensor – minimum offset exceeded	Wiring, FRP sensor, FRP control valve, fuel pump (FP)
P3002	19993	Fuel rail pressure (FRP), flow/rate controlled – pressure too low	Wiring, FRP control valve, fuel pump (FP)
P3003	19993	Fuel rail pressure (FRP), flow/rate controlled – pressure too high	Wiring, FRP control valve





EOBD type	BMW type	Fault location	Probable cause
P3004	19993	Fuel rail pressure (FRP), flow/rate controlled – maximum pressure exceeded	Wiring, FRP control valve
P3005	17760	Fuel rail pressure (FRP), pressure/rate controlled – pressure too low	Wiring, FRP control valve, fuel pump (FP)
P3006	17760	Fuel rail pressure (FRP), pressure/rate controlled – pressure too high	Wiring, FRP control valve
P3007	17760	Fuel rail pressure (FRP), pressure/rate controlled – maximum pressure exceeded	Wiring, FRP control valve
P3090	19993	Fuel rail pressure (FRP), flow/rate controlled – below minimum pressure	Wiring, FRP control valve, fuel pump (FP)
P3091	17760	Fuel rail pressure (FRP), pressure/rate controlled – below minimum pressure	Wiring, FRP control valve, fuel pump (FP)
P3200	18672	Engine control module (ECM) – CAN data bus chip defective	ECM
P3263	16304	Mass air flow (MAF) sensor – voltage too high	Wiring short to positive, MAF sensor
P3264	16304	Mass air flow (MAF) sensor – voltage too low	Wiring short to earth, intake blocked, MAF sensor
P3278	17669	Exhaust gas recirculation (EGR) valve actuator – circuit high	Wiring short to positive, EGR valve actuator



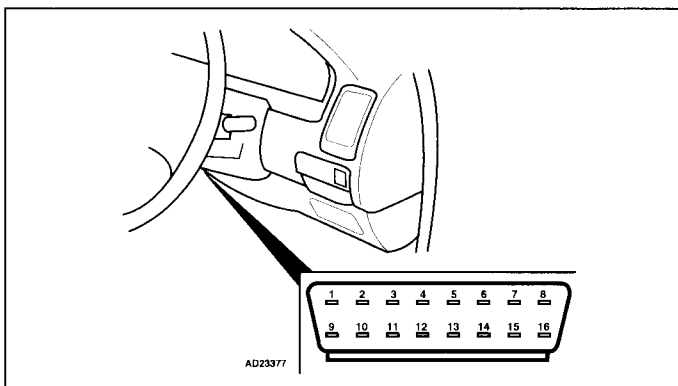


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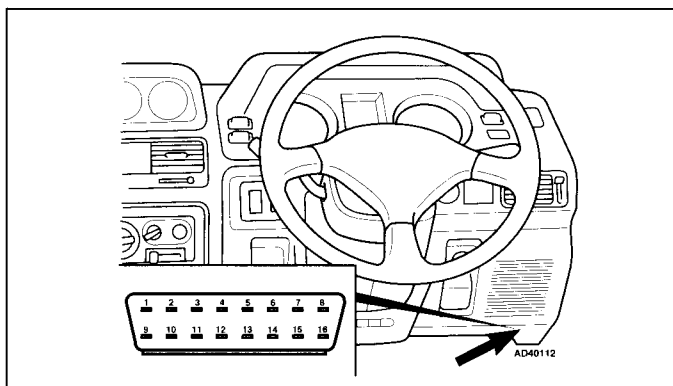
Model: Galant 1,8/2,0/2,5 • Shogun/Pajero 3,0 V6  
Shogun/Pajero 3,5 V6 • Challenger 3,0 V6  
Year: 1993-00  
Engine code: 4G93, 4G63, 6A12, 6G72, 6G73, 6G74  
System: Mitsubishi ECI-Multi

## Engine management

### Data link connector (DLC) locations



Galant – under fascia, driver's side



Shogun/Challenger – under fascia, driver's side

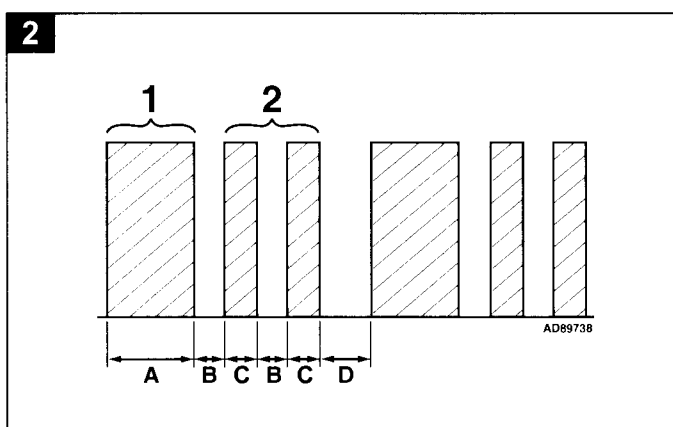
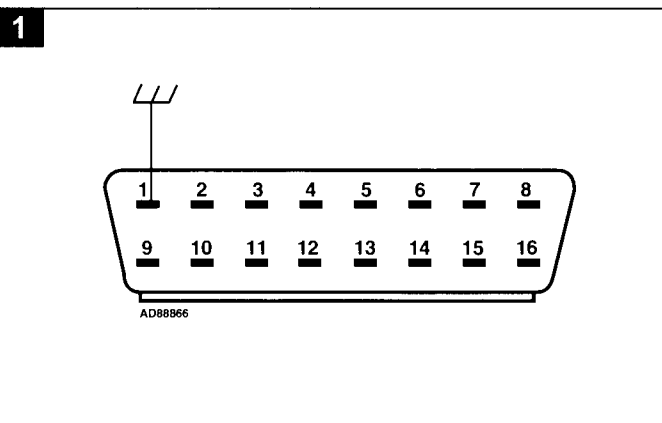
### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

#### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminal 1 and earth **1**.
- Switch ignition ON.
- If no trouble codes are stored, MIL will flash at regular intervals.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of two groups of one or more flashes **2**.
- Long flashes indicate the 'tens' of the trouble code **2** [A].
- Short flashes indicate the 'units' of the trouble code **2** [C].
- A short pause separates each flash **2** [B].
- A long pause separates each trouble code **2** [D].
- For example: Trouble code 12 displayed **2**.





## Erasing

- Ensure ignition switched OFF.
- Disconnect battery earth lead.
- Wait 15 seconds.
- Reconnect battery earth lead.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).

## Trouble code identification

Flash type	Fault location	Probable cause
<b>1</b>	Engine control module (ECM) – malfunction	ECM
11	Heated oxygen sensor (HO2S)/oxygen sensor (O2S) 1 – circuit malfunction	Wiring, HO2S/O2S
12	Mass air flow (MAF) sensor – circuit malfunction	Wiring, MAF sensor, ECM
13	Intake air temperature (IAT) sensor – circuit malfunction	Wiring, IAT sensor, ECM
14	Throttle position (TP) sensor – circuit malfunction	Wiring, TP sensor, ECM
21	Engine coolant temperature (ECT) sensor – circuit malfunction	Wiring, ECT sensor, ECM
22	Crankshaft position (CKP) sensor – circuit malfunction	Wiring, CKP sensor, ECM
23	Camshaft position (CMP) sensor – circuit malfunction	Wiring, CMP sensor, ECM
24	Vehicle speed sensor (VSS) – circuit malfunction	Wiring, VSS, ECM
25	Barometric pressure (BARO) sensor – circuit malfunction	Wiring, BARO sensor, ECM
31	Knock sensor (KS) – circuit malfunction	Wiring, KS, ECM
36	Ignition timing, adjustment connector – short circuit	Wiring, ignition timing connector short to earth
41	Injectors – circuit malfunction	Wiring, injectors, ECM
44	Ignition coil/ignition amplifier – cylinders 1 & 4	Wiring open/short circuit, ignition coil/ignition amplifier, ECM
52	Ignition coil/ignition amplifier – cylinders 2 & 5	Wiring open/short circuit, ignition coil/ignition amplifier, ECM
53	Ignition coil/ignition amplifier – cylinders 3 & 6	Wiring open/short circuit, ignition coil/ignition amplifier, ECM
54	Immobilizer control module/engine control module (ECM) communication – malfunction	Wiring, immobilizer control module, ECM
55	Idle speed control (ISC) actuator – malfunction	Wiring open/short circuit, ISC actuator, ECM
59	Heated oxygen sensor (HO2S)/oxygen sensor (O2S) 2 – circuit malfunction	Wiring, HO2S/O2S, ECM
61	Transmission control module (TCM)/engine control module (ECM), torque reduction signal	Wiring, ECM, TCM
62	Intake manifold air control actuator/position sensor – malfunction	Wiring, intake manifold air control actuator/position sensor, ECM
64	Alternator – circuit malfunction	Wiring, alternator, ECM
71	Traction control, vacuum solenoid – malfunction	Wiring, vacuum solenoid, ECM
72	Traction control, vent solenoid – malfunction	Wiring, vent solenoid, ECM

**1** MIL continuously illuminated



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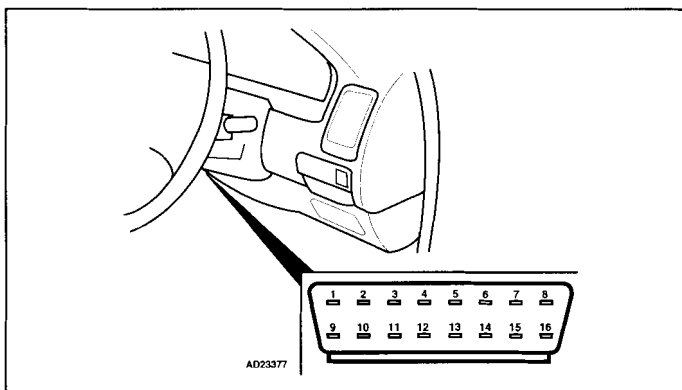
Model:

Galant

Year:

1994-00

Transmission

**Data link connector (DLC) locations**

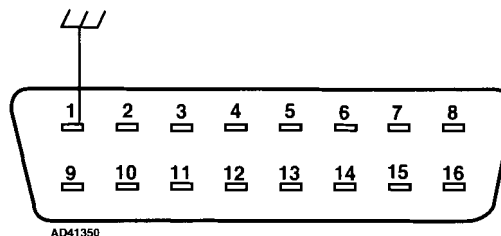
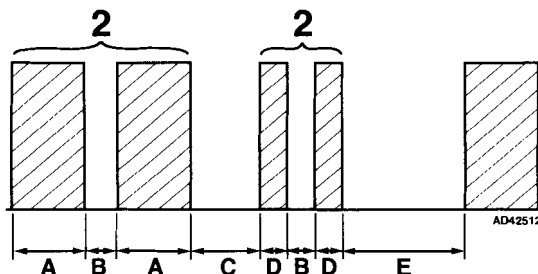
Under fascia, driver's side

**Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using the transmission neutral indicator lamp.
- The transmission control module (TCM) fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).
- Trouble codes may not be displayed if battery voltage is low.

**Accessing**

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminal 1 and earth **1**.
- Switch ignition ON.
- Count transmission neutral indicator lamp flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of two groups of one or more indicator lamp flashes **2**.
- Long flashes indicate the 'tens' of the trouble code **2** [A].
- Short flashes indicate the 'units' of the trouble code **2** [D].
- A short pause separates each trouble code group **2** [C].
- A long pause separates each trouble code **2** [E].
- For example: Trouble code 22 displayed **2**.

**1****2****Erasing**

- Ensure ignition switched OFF.
- Disconnect battery earth lead.
- Wait 15 seconds.
- Reconnect battery earth lead.
- Repeat checking procedure to ensure no data remains in TCM fault memory.

**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).

**Trouble code identification**

Flash type	Fault location	Probable cause
11	Throttle position (TP) sensor/accelerator pedal position (APP) sensor – malfunction	Wiring short circuit, TP/APP sensor
12	Throttle position (TP) sensor/accelerator pedal position (APP) sensor – malfunction	Wiring open circuit, TP sensor
14	Throttle position (TP) sensor/accelerator pedal position (APP) sensor – malfunction	TP/APP sensor incorrect adjustment
15	Transmission fluid temperature (TFT) sensor – malfunction	Wiring open circuit, TFT sensor
21	Crankshaft position (CKP) sensor – circuit malfunction	Wiring, CKP sensor
22	Transmission input shaft speed sensor – circuit malfunction	Wiring open/short circuit, transmission input shaft speed sensor
23	Transmission output shaft speed sensor – circuit malfunction	Wiring open/short circuit, transmission output shaft speed sensor
25	Wide open throttle (WOT) switch – malfunction	Wiring short circuit, WOT switch
26	Brake pedal position (BPP) switch – circuit malfunction	Wiring open/short circuit, BPP switch
31	Transmission reverse/low gear selection solenoid – circuit malfunction	Wiring open/short circuit, transmission reverse/low gear selection solenoid
32	Transmission under-drive solenoid – circuit malfunction	Wiring open/short circuit, transmission under-drive solenoid
33	Transmission second solenoid – circuit malfunction	Wiring open/short circuit, transmission second solenoid
34	Overdrive solenoid – circuit malfunction	Wiring open/short circuit, overdrive solenoid
36	Damper clutch system control solenoid – circuit malfunction	Wiring open/short circuit, damper clutch control solenoid, TCM
41	First gear, ratio – out of limits	Wiring, transmission input/output shaft speed sensors, transmission
42	Second gear, ratio – out of limits	Wiring, transmission input/output shaft speed sensors, transmission
43	Third gear, ratio – out of limits	Wiring, transmission input/output shaft speed sensors, transmission
44	Fourth gear, ratio – out of limits	Wiring, transmission input/output shaft speed sensors, transmission
46	Reverse gear, ratio – out of limits	Wiring, transmission input/output shaft speed sensors, transmission
51	Transmission control module (TCM)/engine control module (ECM)/traction control module – communication malfunction	Wiring, ECM, TCM
52	Damper clutch system – defective	Wiring open/short circuit, damper clutch system
54	Transmission system relay – circuit malfunction	Wiring open circuit/short to earth, transmission system relay, TCM
56	Transmission neutral indicator lamp – circuit malfunction	Wiring short to earth, transmission neutral indicator lamp, TCM
71	Transmission control module (TCM) – defective	TCM



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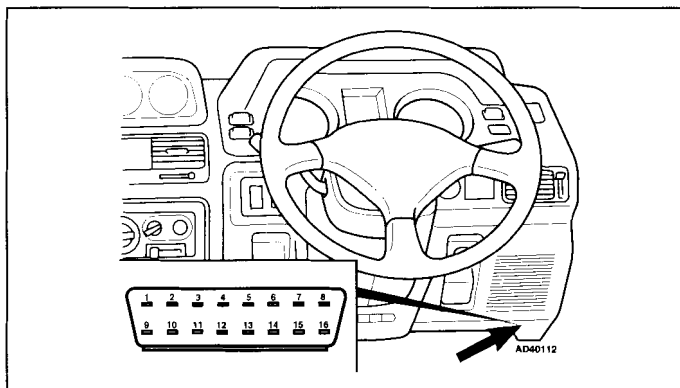
Model:

Shogun/Pajero

Year:

1994-00

Transmission

**Data link connector (DLC) locations**

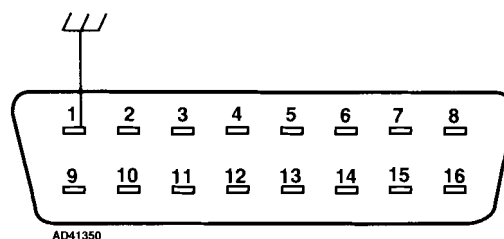
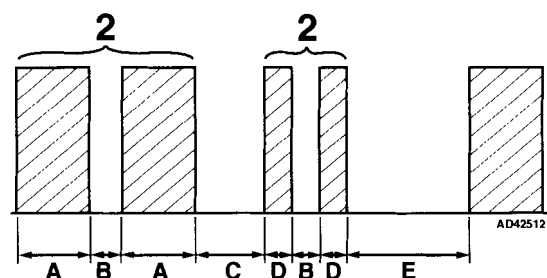
Next to fascia fusebox

**Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using the AT/fluid temperature warning lamp.
- The transmission control module (TCM) fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).
- Trouble codes may not be displayed if battery voltage is low.

**Accessing**

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminal 1 and earth **1**.
- Switch ignition ON.
- Count AT/fluid temperature warning lamp flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of two groups of one or more warning lamp flashes **2**.
- Long flashes indicate the 'tens' of the trouble code **2** [A].
- Short flashes indicate the 'units' of the trouble code **2** [D].
- A short pause separates each trouble code group **2** [C].
- A long pause separates each trouble code **2** [E].
- For example: Trouble code 22 displayed **2**.

**1****2**

**Erasing**

- Ensure ignition switched OFF.
- Disconnect battery earth lead.
- Wait 15 seconds.
- Reconnect battery earth lead.
- Repeat checking procedure to ensure no data remains in TCM fault memory.

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

**Trouble code identification**

Flash type	Fault location	Probable cause
11	Throttle position (TP) sensor – malfunction	Wiring open/short circuit, TP sensor
22	Wide open throttle (WOT) switch – malfunction	Wiring short circuit, WOT switch
32	Transmission output shaft speed sensor – malfunction	Wiring open circuit, transmission output shaft speed sensor, TCM
38	Vehicle speed sensor (VSS) – malfunction	Wiring open circuit, VSS, TCM
41	Shift solenoid (SS) A – malfunction	Wiring open circuit, SS, TCM
42	Shift solenoid (SS) A – malfunction	Wiring short circuit, SS, TCM
43	Shift solenoid (SS) B – malfunction	Wiring open circuit, SS, TCM
44	Shift solenoid (SS) B – malfunction	Wiring short circuit, SS, TCM
47	Transmission lock-up control valve – malfunction	Wiring open circuit, transmission lock-up control valve, TCM
48	Transmission lock-up control valve – malfunction	Wiring short circuit, transmission lock-up control valve, TCM





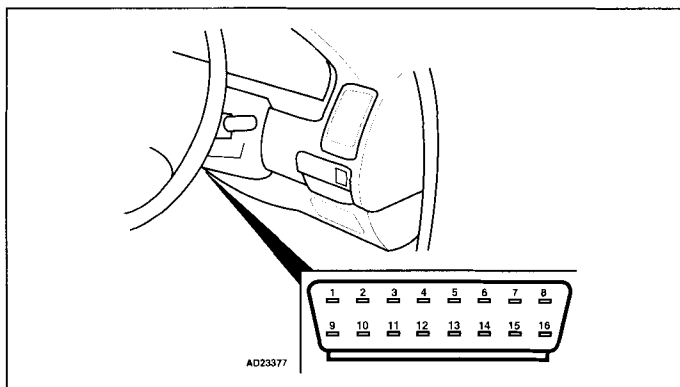
# MITSUBISHI

Model:  
Year:

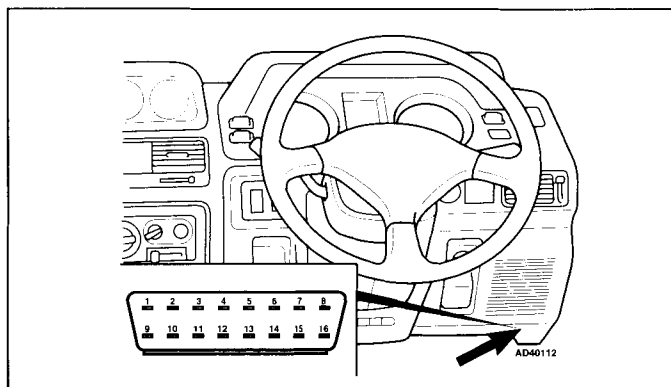
Galant • Shogun/Pajero • Challenger  
1996-00

## Immobilizer

### Data link connector (DLC) locations



Galant



Shogun/Challenger

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The immobilizer control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

Scanner type	Fault location	Probable cause
11	Immobilizer read coil – circuit malfunction	Wiring, ignition key, immobilizer read coil, immobilizer control module
12	Ignition key – incorrect signal	Incorrectly coded/incorrect ignition key, immobilizer control module
21	Engine control module (ECM)/immobilizer control module/diagnostic equipment communication – malfunction	Wiring, ECM, immobilizer control module
31	Immobilizer control module – malfunction	Immobilizer control module
32	Supply voltage, ignition switch – circuit malfunction	Wiring, ignition switch, immobilizer control module



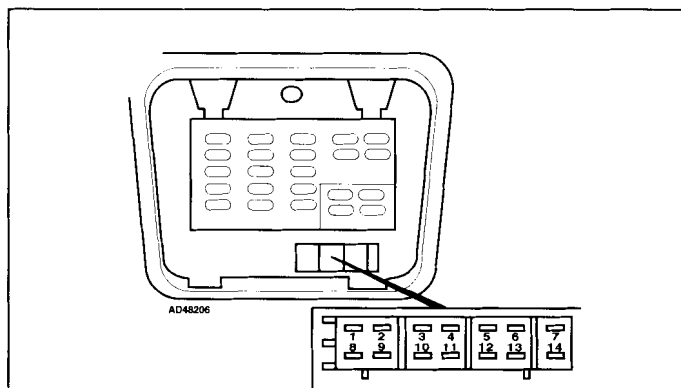


Model: Micra 1,0/1,3  
Year: 1992-98  
Engine code: CG10DE, CG13DE  
System: Nissan ECCS

NISSAN

Engine management

## Data link connector (DLC) locations

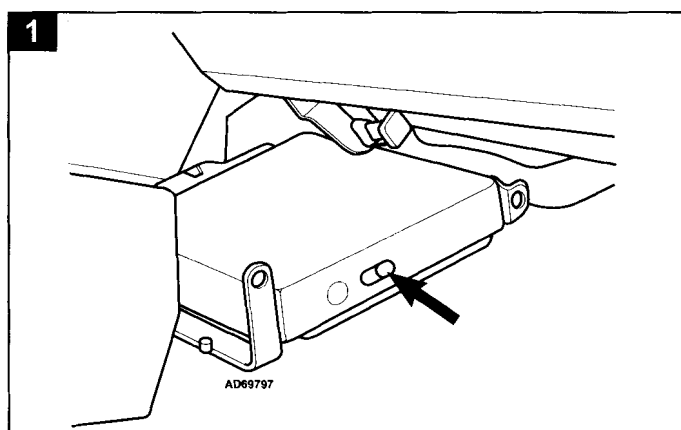


In fascia fusebox

## Trouble codes

### General information

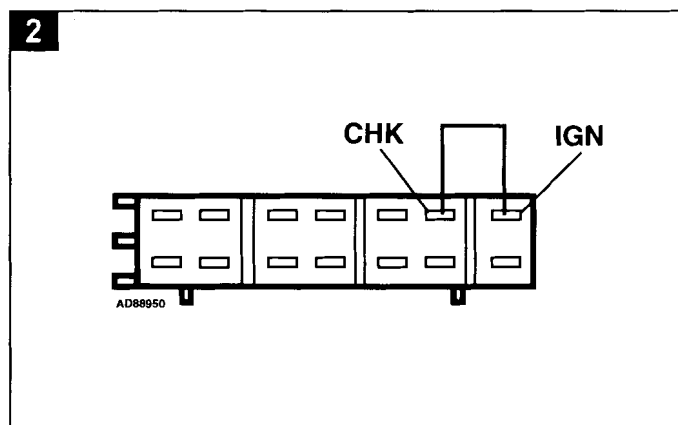
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Vehicles without MIL: Trouble codes are displayed by the red LED in the ECM **1**.
- Vehicles with MIL: Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).



### Accessing

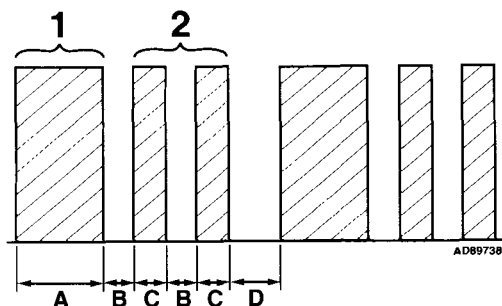
- Switch ignition ON.
- Bridge data link connector (DLC) terminals IGN and CHK **2**.
- Wait 2 seconds.
- Disconnect bridge wire from data link connector (DLC) **2**.
- Vehicles without MIL: Count ECM red LED flashes. Compare with trouble code table.
- Vehicles with MIL: Count MIL flashes. Compare with trouble code table.
- Long flashes indicate the 'tens' of the trouble code **3** [A].
- Short flashes indicate the 'units' of the trouble code **3** [C].
- A short pause separates each flash **3** [B].
- A long pause separates each trouble code **3** [D].
- For example: Trouble code 12 displayed **3**.
- Switch ignition OFF. Rectify faults as necessary.

**NOTE:** If trouble code 28 is displayed it should be ignored.



**NISSAN**

Model: Micra 1,0/1,3

**Engine management****3****Erasing**

- Switch ignition ON.
- Bridge data link connector (DLC) terminals IGN and CHK **2**.
- Wait 2 seconds.
- Disconnect bridge wire from data link connector (DLC) **2**.
- Bridge data link connector (DLC) terminals IGN and CHK **2**.
- Wait 2 seconds.
- Disconnect bridge wire from data link connector (DLC) **2**.
- Switch ignition OFF.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

**Trouble code identification**

Flash type	Fault location	Probable cause
11	Crankshaft position (CKP) sensor – intermittent signal	Wiring, CKP
12	Mass air flow (MAF) sensor – circuit malfunction	Wiring open/short circuit, MAF sensor
13	Engine coolant temperature (ECT) sensor – circuit malfunction	Wiring open/short circuit, ECT sensor
21	Ignition signal – circuit malfunction	Wiring open/short circuit, ignition amplifier
43	Throttle position (TP) sensor – circuit malfunction	Wiring open/short circuit, TP sensor
55	No fault found	–



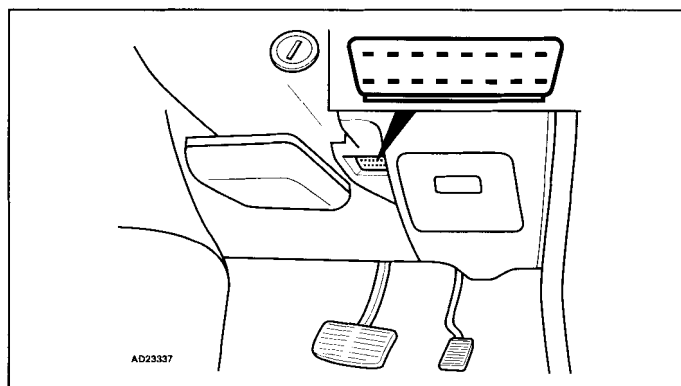
Model: Micra 1,0/1,4  
 Year: 1999-02  
 Engine code: CG10DE, CGA3DE  
 System: Nissan ECCS

**NISSAN**



Engine management/transmission

## Data link connector (DLC) locations



## Engine management

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1605	Engine control module (ECM)/transmission control module (TCM) communication signal – malfunction	Wiring open/short circuit, system voltage low, TCM
P1610	Ignition key/engine control module (ECM) – malfunction	Incorrect ignition key, ECM
P1611	Immobilizer control module/engine control module (ECM) – coding	Immobilizer control module/ECM incorrectly coded
P1612	Immobilizer control module/engine control module (ECM) communication – malfunction	Wiring, immobilizer control module, ECM
P1613	Engine control module (ECM), immobilizer function – internal failure	ECM
P1614	Immobilizer control module/module coding plug communication – no signal	Wiring, immobilizer control module, module coding plug
P1615	Ignition key/immobilizer control module communication – malfunction	Incorrect ignition key, immobilizer control module
P1705	Throttle position (TP) sensor – circuit malfunction	Wiring open/short circuit, TP switch/sensor
P1706	Park/neutral position (PNP) switch – circuit malfunction	Wiring open/short circuit, PNP switch
P1751	Transmission shift control valve – malfunction	Transmission shift control valve

**NISSAN**

Model: Micra 1,0/1,4



Engine management/transmission

EOBD type	Fault location	Probable cause
P1753	Transmission shift control valve – circuit malfunction	Wiring open/short circuit, transmission shift
P1756	Transmission fluid pressure (TFP) solenoid – malfunction	TFP solenoid
P1758	Transmission fluid pressure (TFP) solenoid – circuit malfunction	Wiring open/short circuit, TFP solenoid
P1763	Transmission clutch pressure control solenoid – circuit malfunction	Wiring open/short circuit, transmission clutch pressure control solenoid
P1766	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring open/short circuit, TCC solenoid
P1768	Transmission clutch switching solenoid – circuit malfunction	Wiring open/short circuit, transmission clutch switching solenoid
P1791	Transmission fluid pressure (TFP) sensor – circuit malfunction	Wiring open/short circuit, TFP sensor



Model: Sunny 1,4/1,6/2,0 • Sunny Estate/Van  
Almera 1,4/1,6/2,0 • Primera 1,6/2,0  
100NX 1,6/2,0 • 200SX 2,0 • Serena 1,6/2,0  
Terrano II 2,4 • Patrol 4,2 • Pick-up/Navara 2,4

Year: 1990-00

Engine code: GA14DE, GA16DE, KA24E, SR20DE, SR20DET,  
SR20DI, TB42E

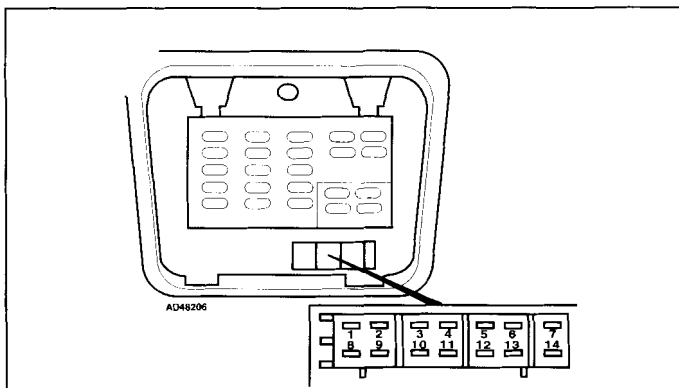
System: Nissan ECCS

**NISSAN**

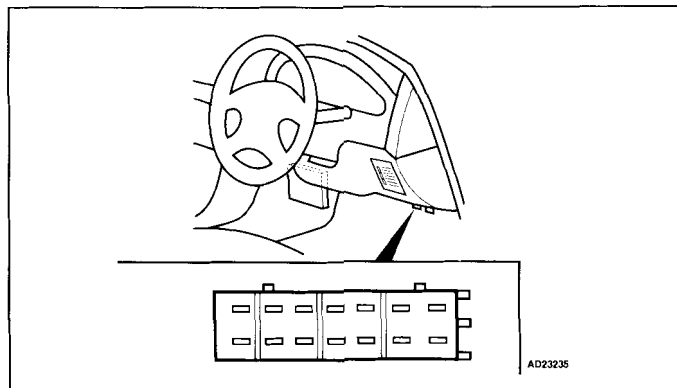


Engine management

## Data link connector (DLC) locations



Except Serena – in fascia fusebox



Serena – under fascia fusebox

## Trouble codes

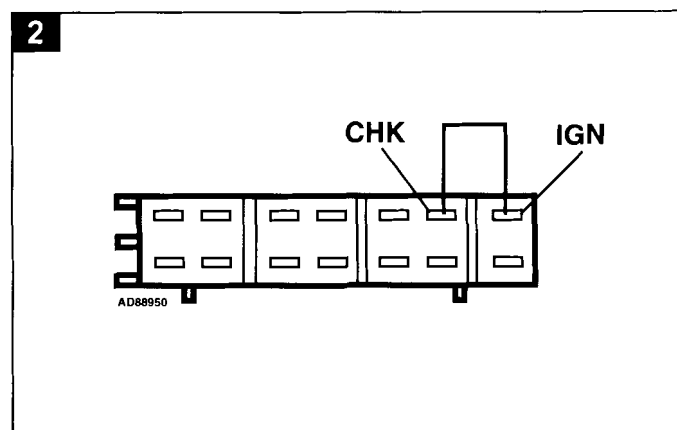
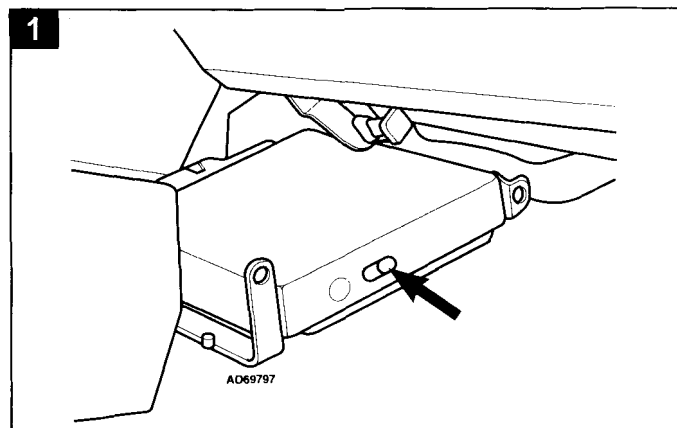
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).
- Switch ignition ON.
- Check that MIL illuminates.
- Start engine. Allow to idle.
- If MIL extinguishes: No trouble codes have been recorded.
- If MIL remains illuminated: Access trouble codes.

### Accessing

**NOTE:** Some models will also display trouble codes by the red LED in the ECM **1**.

- Switch ignition ON.
- Bridge data link connector (DLC) terminals IGN and CHK **2**.
- Wait 2 seconds.
- Disconnect bridge wire from data link connector (DLC) **2**.
- Count MIL flashes. Compare with trouble code table.
- Long flashes indicate the 'tens' of the trouble code **3** [A].
- Short flashes indicate the 'units' of the trouble code **3** [C].
- A short pause separates each flash **3** [B].
- A long pause separates each trouble code **3** [D].
- For example: Trouble code 12 displayed **3**.
- Switch ignition OFF. Rectify faults as necessary.



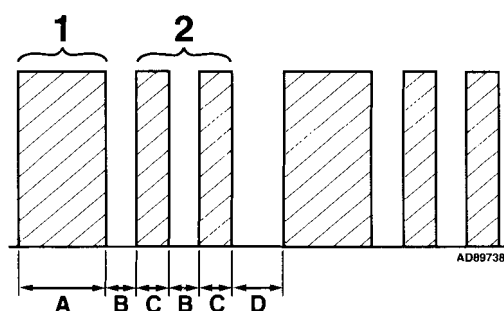


# NISSAN

Model: Sunny 1,4/1,6/2,0 • Sunny Estate/Van • Almera 1,4/1,6/2,0  
Primera 1,6/2,0 • 100NX 1,6/2,0 • 200SX 2,0 • Serena 1,6/2,0  
Terrano II 2,4 • Patrol 4,2 • Pick-up/Navara 2,4

## Engine management

3



### Erasing

- Switch ignition ON.
- Bridge data link connector (DLC) terminals IGN and CHK **2**.
- Wait 2 seconds.
- Disconnect bridge wire from data link connector (DLC) **2**.
- Check that MIL flashes.
- Bridge data link connector (DLC) terminals IGN and CHK **2**.
- Wait 2 seconds.
- Disconnect bridge wire from data link connector (DLC) **2**.
- Switch ignition OFF.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

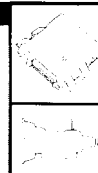
### Trouble code identification

Flash type	Fault location	Probable cause
11	Camshaft position (CMP) sensor/crankshaft position (CKP) sensor – intermittent signal	Wiring, CMP/CKP
12	Mass air flow (MAF) sensor – circuit malfunction	Wiring open/short circuit, MAF sensor
13	Engine coolant temperature (ECT) sensor – circuit malfunction	Wiring open/short circuit, ECT sensor
21	Ignition signal – circuit malfunction	Wiring open/short circuit, ignition amplifier
28	Engine coolant blower motor – malfunction	Wiring, engine coolant blower motor, coolant system
34	Knock sensor (KS) – circuit malfunction	Wiring open/short circuit, KS
41	Intake air temperature (IAT) sensor – circuit malfunction	Wiring open/short circuit, IAT sensor
43	Throttle position (TP) sensor – circuit malfunction	Wiring open/short circuit, TP sensor
55	No fault found	–



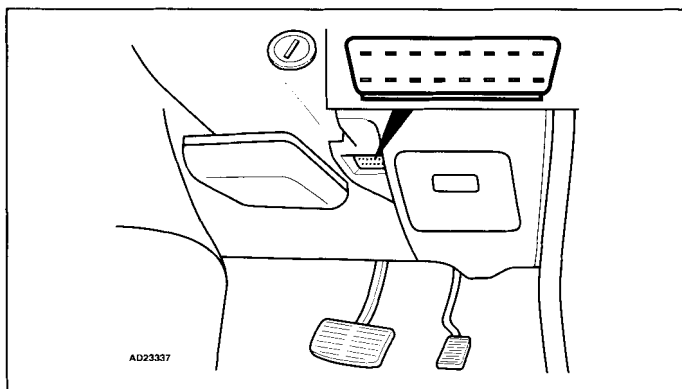
Model: Almera 1,5/1,8 • Almera Tino 1,8/2,0  
 Primera 1,6/1,8/2,0  
 Year: 1999-02  
 Engine code: GA16DE, QG15DE, QG16DE, QG18DE, QGA18DE,  
 SR20DE  
 System: Nissan ECCS

**NISSAN**

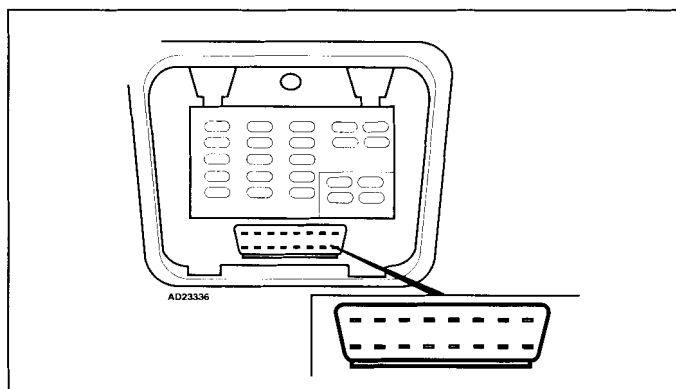


Engine management/transmission

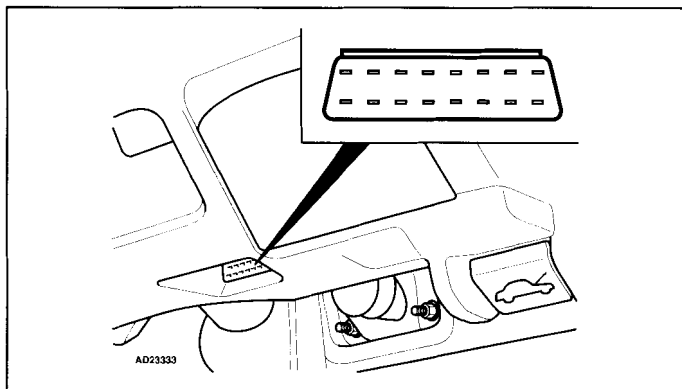
## Data link connector (DLC) locations



Micra



Primera – in fascia fusebox



Almera/Almera Tino

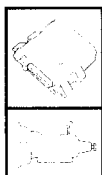
## Trouble codes

### General information

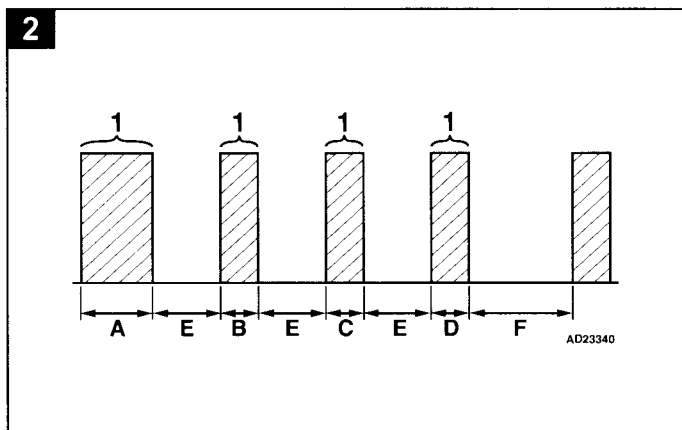
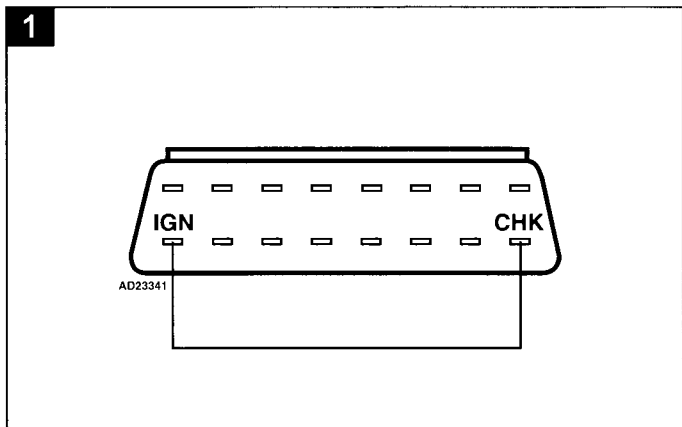
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).
- CAN data bus enables the engine control module (ECM) to display diagnostic information relating to immobilizer and transmission systems.
- Self-diagnosis using the MIL may not display all available trouble codes.

### Accessing

- Switch ignition ON.
- Bridge data link connector (DLC) terminals IGN and CHK **1**.
- Wait 2 seconds.
- Disconnect bridge wire from data link connector (DLC) **1**.
- Count MIL flashes. Compare with trouble code table.
- Each trouble code consists of four groups of one or more flashes.
- The first group of flashes indicate the 'thousands' of the trouble code **2** [A].
- The second group of flashes indicate the 'hundreds' of the trouble code **2** [B].
- The third group of flashes indicate the 'tens' of the trouble code **2** [C].
- The fourth group of flashes indicate the 'units' of the trouble code **2** [D].

	<div> <b>NISSAN</b> </div> <div> Model:    Almera 1,5/1,8   •   Almera Tino 1,8/2,0   •   Primera 1,6/1,8/2,0 </div> <div> Engine management/transmission </div>
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- Ten flashes in a group indicate '0'.
- A short pause separates each trouble code group **2** [E].
- A long pause separates each trouble code **2** [F].
- For example: Trouble code P1111 displayed **2**.
- Switch ignition OFF. Rectify faults as necessary.



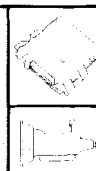
### Erasing

- Switch ignition ON.
- Bridge data link connector (DLC) terminals IGN and CHK **1**.
- Wait 2 seconds.
- Disconnect bridge wire from data link connector (DLC) **1**.
- Check that MIL flashes.
- Bridge data link connector (DLC) terminals IGN and CHK **1**.
- Wait 2 seconds.
- Disconnect bridge wire from data link connector (DLC) **1**.
- Switch ignition OFF.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1111	Camshaft position (CMP) actuator – circuit malfunction	Wiring open/short circuit, CMP actuator
P1131	Intake manifold air control solenoid – circuit malfunction	Wiring open/short circuit, intake manifold air control solenoid
P1217	Engine coolant blower motor – malfunction	Wiring, engine coolant blower motor, coolant system
P1227	Engine coolant blower motor – malfunction	Wiring, engine coolant blower motor, coolant system
P1336	Crankshaft position (CKP) sensor – faulty signal	Wiring, CKP sensor, flywheel/drive plate
P1401	Exhaust gas recirculation temperature (EGRT) sensor – circuit malfunction	Wiring open/short circuit, EGRT sensor, EGR system
P1402	Exhaust gas recirculation (EGR) valve actuator – circuit malfunction	Wiring open/short circuit, EGR valve actuator, EGRT sensor
P1604	Transmission control module (TCM)/engine control module (ECM) communication – incorrect signal	Wiring open/short circuit, system voltage low, TCM





## Engine management/transmission

EOBD type	Fault location	Probable cause
P1605	Engine control module (ECM)/transmission control module (TCM) communication signal – malfunction	Wiring open/short circuit, system voltage low, TCM
P1610	Ignition key/engine control module (ECM) – malfunction	Incorrect ignition key, ECM
P1611	Immobilizer control module/engine control module (ECM) – coding	Immobilizer control module/ECM incorrectly coded
P1612	Immobilizer control module/engine control module (ECM) communication – malfunction	Wiring, immobilizer control module, ECM
P1613	Engine control module (ECM), immobilizer function – internal failure	ECM
P1614	Immobilizer control module/module coding plug communication – no signal	Wiring, immobilizer control module, module coding plug
P1615	Ignition key/immobilizer control module communication – malfunction	Incorrect ignition key, immobilizer control module
P1705	Throttle position (TP) sensor – circuit malfunction	Wiring open/short circuit, TP switch/sensor
P1706	Park/neutral position (PNP) switch – circuit malfunction	Wiring open/short circuit, PNP switch
P1751	Transmission shift control valve – malfunction	Transmission shift control valve
P1753	Transmission shift control valve – circuit malfunction	Wiring open/short circuit, transmission shift
P1756	Transmission fluid pressure (TFP) solenoid – malfunction	TFP solenoid
P1758	Transmission fluid pressure (TFP) solenoid – circuit malfunction	Wiring open/short circuit, TFP solenoid
P1763	Transmission clutch pressure control solenoid – circuit malfunction	Wiring open/short circuit, transmission clutch pressure control solenoid
P1766	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring open/short circuit, TCC solenoid
P1768	Transmission clutch switching solenoid – circuit malfunction	Wiring open/short circuit, transmission clutch switching solenoid
P1777	Transmission shift control valve – circuit malfunction	Wiring open/short circuit, transmission shift control valve
P1778	Transmission shift control valve – malfunction	Transmission shift control valve
P1791	Transmission fluid pressure (TFP) sensor – circuit malfunction	Wiring open/short circuit, TFP sensor





# NISSAN

Model: Almera 1,5/1,8 • Almera Tino 1,8  
Primera 1,6/1,8/2,0 • X-Trail 2,0/2,5  
Navara Pick-up 2,4

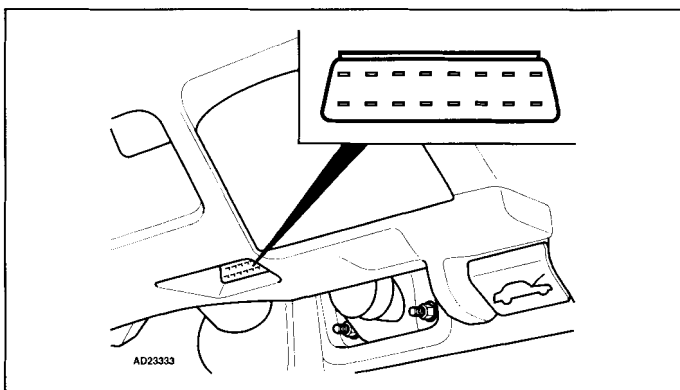
Year: 2001-04

Engine code: KA24E, QG15DE, QG16DE, QG18DE, QR20DE, QR25DE

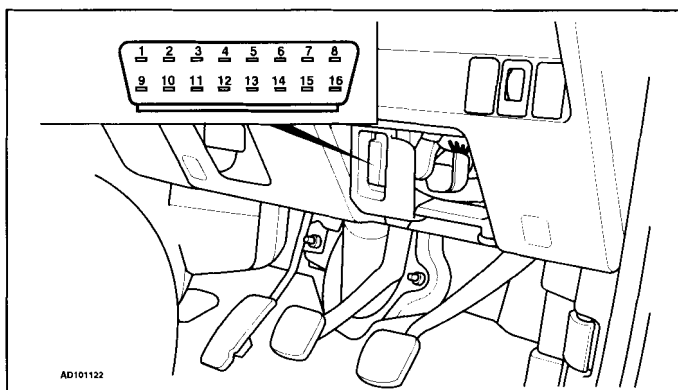
System: Nissan ECCS

Engine management/transmission

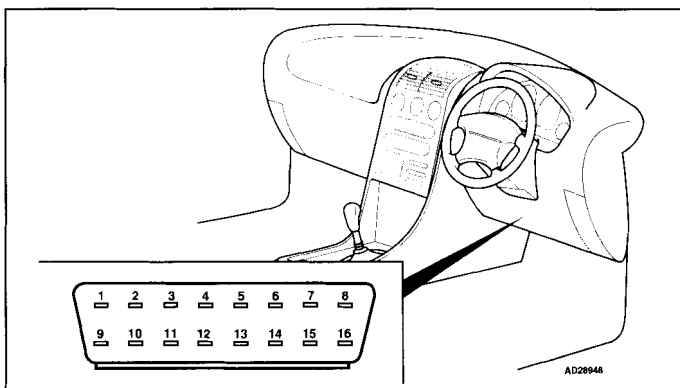
## Data link connector (DLC) locations



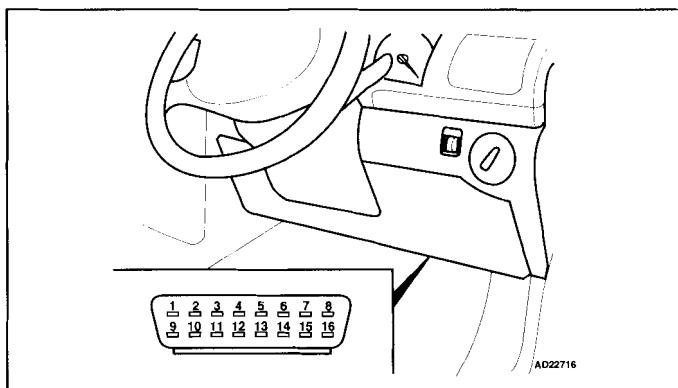
Almera/Almera Tino



X-Trail



Primera



Navara Pick-up

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes can be displayed by using diagnostic equipment connected to the data link connector (DLC) or by the malfunction indicator lamp (MIL).

### Accessing

**NOTE:** To access trouble codes, accelerator pedal position (APP) sensor must be functioning correctly.

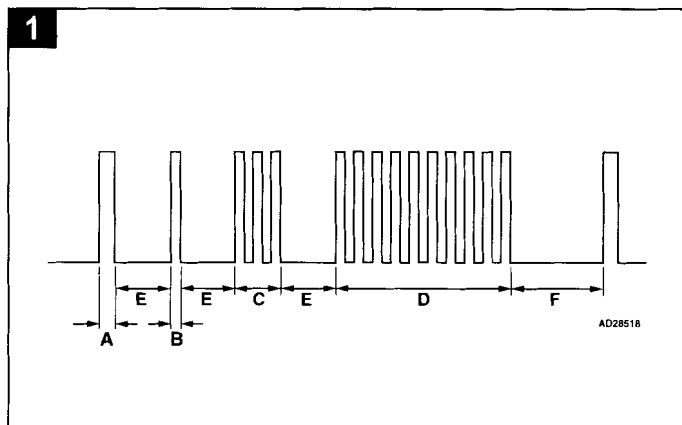
- Ensure accelerator pedal is fully released.
- Switch ignition ON. DO NOT start engine.
- Wait 3 seconds.

- Within 5 seconds, repeat the following 5 times:
  - Fully depress accelerator pedal.
  - Fully release accelerator pedal.
  - Wait 7 seconds.
  - Fully depress accelerator pedal.
  - After approximately 10 seconds MIL will start flashing.
  - Fully release accelerator pedal.
  - Trouble codes are now displayed by MIL.
  - Count MIL flashes.
  - Compare with trouble code table.
  - Each trouble code consists of four groups of one or more flashes:
    - The first group of flashes indicate the 'thousands' of the trouble code **1** [A].
    - The second group of flashes indicate the 'hundreds' of the trouble code **1** [B].
    - The third group of flashes indicate the 'tens' of the trouble code **1** [C].

- The fourth group of flashes indicate the 'units' of the trouble code **1** [D].
- Ten flashes in a group indicate '0'.
- A short pause separates each trouble code group **1** [E].
- A long pause separates each trouble code **1** [F].
- For example: Trouble code P1130 displayed **1**.
- Switch ignition OFF.

### Erasing

- Ensure accelerator pedal is fully released.
- Ensure ignition switched OFF for at least 10 seconds.
- Switch ignition ON. DO NOT start engine.
- Wait 3 seconds.
- Within 5 seconds, repeat the following 5 times:
  - Fully depress accelerator pedal.
  - Fully release accelerator pedal.
  - Wait 7 seconds.
  - Fully depress accelerator pedal.
- After approximately 10 seconds MIL will start flashing.
- Fully release accelerator pedal.
- Trouble codes are now displayed by MIL.
- Fully depress accelerator pedal for more than 10 seconds.
- Fully release accelerator pedal.
- Trouble code 0000 should be displayed.



### Trouble code identification



Flash type	EOBD type	Fault location	Probable cause
–	P0	Refer to EOBD trouble code table	–
0011	–	Camshaft position control system – bank 1 – performance problem	Wiring, CMP sensor, CKP sensor, valve timing sensor
0021	–	Camshaft position control system – bank 2 – performance problem	Wiring, CMP sensor, CKP sensor, valve timing sensor
0031	–	Heated oxygen sensor (HO2S) 1, bank 1 – heater voltage low	Wiring, HO2S heater, ECM
0032	–	Heated oxygen sensor (HO2S) 1, bank 1 – heater voltage high	Wiring, HO2S heater, ECM
0037	–	Heated oxygen sensor (HO2S) 2, bank 1 – heater voltage low	Wiring, HO2S heater, ECM
0038	–	Heated oxygen sensor (HO2S) 2, bank 1 – heater voltage high	Wiring, HO2S heater, ECM
0051	–	Heated oxygen sensor (HO2S) 1, bank 2 – heater voltage low	Wiring, HO2S heater, ECM
0052	–	Heated oxygen sensor (HO2S) 1, bank 2 – heater voltage high	Wiring, HO2S heater, ECM
0057	–	Heated oxygen sensor (HO2S) 2, bank 2 – heater voltage low	Wiring, HO2S heater, ECM
0058	–	Heated oxygen sensor (HO2S) 2, bank 2 – heater voltage high	Wiring, HO2S heater, ECM
0101	–	Mass air flow (MAF) sensor – range/performance problem	Wiring, MAF sensor, air leak, ECM
0102	–	Mass air flow (MAF) sensor – voltage low	Wiring, MAF sensor, air leak, ECM

**NISSAN**Model: Almera 1,5/1,8 • Almera Tino 1,8 • Primera 1,6/1,8/2,0  
X-Trail 2,0/2,5 • Navara Pick-up 2,4

Engine management/transmission

Flash type	EOBD type	Fault location	Probable cause
0103	–	Mass air flow (MAF) sensor – voltage high	Wiring, MAF sensor, ECM
0107	–	Manifold absolute pressure (MAP) sensor – voltage low	Wiring, MAP sensor, ECM
0108	–	Manifold absolute pressure (MAP) sensor – voltage high	Wiring, MAP sensor, ECM
0112	–	Intake air temperature (IAT) sensor – voltage low	Wiring, IAT sensor, ECM
0113	–	Intake air temperature (IAT) sensor – voltage high	Wiring, IAT sensor, ECM
0117	–	Engine coolant temperature (ECT) sensor – voltage low	Wiring, ECT sensor, ECM
0118	–	Engine coolant temperature (ECT) sensor – voltage high	Wiring, ECT sensor, ECM
0121	–	Throttle position (TP) sensor – range/performance problem	Wiring, TP sensor, ECM
0122	–	Throttle position (TP) sensor – voltage low	Wiring, TP sensor, ECM
0123	–	Throttle position (TP) sensor – voltage high	Wiring, TP sensor, ECM
0125	–	Engine coolant temperature – insufficient coolant temperature for closed loop fuel control	Wiring, ECT sensor, engine cooling system, ECM
0127	–	Intake air temperature (IAT) sensor – intake air temperature too high	Wiring short circuit, IAT sensor, ECM
0128	–	Engine coolant temperature too low	Engine coolant thermostat, ECT sensor, engine cooling system, ECM
0132	–	Heated oxygen sensor (HO2S) 1, bank 1 – voltage high	Wiring, HO2S, fuel system, injector, ECM
0133	–	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Wiring, HO2S, intake/fuel system, injector, exhaust system, MAF sensor, ECM
0134	–	Heated oxygen sensor (HO2S) 1, bank 1 – voltage high	Wiring, HO2S, ECM
0138	–	Heated oxygen sensor (HO2S) 2, bank 1 – voltage high	Wiring, HO2S, intake/fuel system, injector, ECM
0139	–	Heated oxygen sensor (HO2S) 2, bank 1 – circuit malfunction	Wiring, HO2S, intake/fuel system, injector, ECM
0152	–	Heated oxygen sensor (HO2S) 1, bank 2 – voltage high	Wiring, HO2S, fuel system, injector, ECM
0153	–	Heated oxygen sensor (HO2S) 1, bank 2 – slow response	Wiring, HO2S, intake/fuel system, injector, exhaust system, crankcase vent valve, MAF sensor, ECM
0154	–	Heated oxygen sensor (HO2S) 1, bank 2 – voltage high	Wiring, HO2S, ECM
0158	–	Heated oxygen sensor (HO2S) 2, bank 2 – voltage high	Wiring, HO2S, intake/fuel system, injector, ECM
0159	–	Heated oxygen sensor (HO2S) 2, bank 2 – circuit malfunction	Wiring, HO2S, intake/fuel system, injector, ECM
0171	–	Fuel trim – bank 1 – mixture too lean	Wiring, exhaust system, front HO2S, fuel system, injector, MAF sensor, ECM

Flash type	EOBD type	Fault location	Probable cause
0172	–	Fuel trim – bank 1 – mixture too rich	Wiring, intake/exhaust system, front HO2S, fuel system, injector, MAF sensor, ECM
0174	–	Fuel trim – bank 2 – mixture too lean	Wiring, exhaust system, front HO2S, fuel system, injector, MAF sensor, ECM
0175	–	Fuel trim – bank 2 – mixture too rich	Wiring, exhaust system, front HO2S, fuel system, injector, MAF sensor, ECM
0181	–	Fuel tank temperature sensor – range/performance problem	Wiring, fuel tank temperature sensor, ECM
0182	–	Fuel tank temperature sensor – voltage low	Wiring, fuel tank temperature sensor, ECM
0183	–	Fuel tank temperature sensor – voltage high	Wiring, fuel tank temperature sensor, ECM
0217	–	Engine over temperature condition	Wiring, engine coolant blower, coolant hoses, engine coolant thermostat, radiator, engine coolant temperature (ECT) switch
0221	–	Throttle position (TP) sensor 1 & 2 – range/performance problem	Wiring, TP sensor, ECM
0222	–	Throttle position (TP) sensor 1 – voltage low	Wiring, TP sensor, ECM
0223	–	Throttle position (TP) sensor 1 – voltage high	Wiring, TP sensor, ECM
0226	–	Accelerator pedal position (APP) sensor 1/2 – range/performance problem	Wiring, APP sensor, ECM
0227	–	Accelerator pedal position (APP) sensor 1 – voltage low	Wiring, APP sensor, ECM
0228	–	Accelerator pedal position (APP) sensor 1 – voltage high	Wiring, APP sensor, ECM
0245	–	Supercharger (SC) bypass valve – malfunction	Wiring, SC bypass valve, hose blocked/leaking
0300	–	Random misfire	Wiring, mechanical fault, fuel system, EGR valve, injector, intake system, ignition system, CKP sensor, front HO2S, ECM
0301	–	Cylinder 1 – misfire	Wiring, mechanical fault, fuel system, EGR valve, injector, intake system, ignition system, CKP sensor, front HO2S, ECM
0302	–	Cylinder 2 – misfire	Wiring, mechanical fault, fuel system, EGR valve, injector, intake system, ignition system, CKP sensor, front HO2S, ECM
0303	–	Cylinder 3 – misfire	Wiring, mechanical fault, fuel system, EGR valve, injector, intake system, ignition system, CKP sensor, front HO2S, ECM
0304	–	Cylinder 4 – misfire	Wiring, mechanical fault, fuel system, EGR valve, injector, intake system, ignition system, CKP sensor, front HO2S, ECM
0305	–	Cylinder 5 – misfire	Wiring, mechanical fault, fuel system, EGR valve, injector, intake system, ignition system, CKP sensor, front HO2S, ECM
0306	–	Cylinder 6 – misfire	Wiring, mechanical fault, fuel system, EGR valve, injector, intake system, ignition system, CKP sensor, front HO2S, ECM

	<b>NISSAN</b>	Model: Almera 1,5/1,8 • Almera Tino 1,8 • Primera 1,6/1,8/2,0 X-Trail 2,0/2,5 • Navara Pick-up 2,4
	Engine management/transmission	

Flash type	EOBD type	Fault location	Probable cause
0327	–	Knock sensor (KS) – voltage low	Wiring, KS, ECM
0328	–	Knock sensor (KS) – voltage high	Wiring, KS, ECM
0335	–	Crankshaft position (CKP) sensor 1 – circuit malfunction	Wiring, CKP sensor, ECM
0340	–	Camshaft position (CMP) sensor – circuit malfunction	Wiring, CMP sensor, starter motor, ECM
0400	–	Exhaust gas recirculation (EGR) system – insufficient/excessive flow detected	Wiring, hose blocked/leaking, EGR valve, EGR valve, EVAP valve, ECM
0402	–	Exhaust gas recirculation (EGR) system – valve malfunction	Wiring, EGR valve, EGR back pressure transducer, hose blocked/leaking, CMP sensor, MAF sensor, EGR valve, EVAP valve, ECM
0405	–	Exhaust gas recirculation temperature (EGRT) sensor – low voltage	Wiring, EGRT sensor, ECM
0406	–	Exhaust gas recirculation temperature (EGRT) sensor – high voltage	Wiring, EGRT sensor, ECM
0420	–	Catalytic converter – bank 1 – efficiency below threshold	Catalytic converter, wiring, intake/exhaust system, injector, ECM
0430	–	Catalytic converter – bank 2 – efficiency below threshold	Catalytic converter, wiring, intake/exhaust system, injector, ECM
0441	–	Evaporative emission (EVAP) system – flow malfunction	Wiring, EVAP valve, hose blocked/leaking, EVAP canister, BARO sensor, MAP/BARO switching valve, ECM
0442	–	Evaporative emission (EVAP) system – small leak detected	Wiring, fuel tank, fuel filler cap, hose blocked/leaking, EVAP valve, EVAP canister, EVAP vent valve, BARO sensor, MAP/BARO switching valve, ECM
0444	–	Evaporative emission (EVAP) system – control valve malfunction	Wiring, EVAP control valve, EVAP valve/pressure sensor, hose blocked/leaking, ECM
0445	–	Evaporative emission (EVAP) system – control valve malfunction	Wiring, EVAP control valve, EVAP valve/pressure sensor, hose blocked/leaking, ECM
0447	–	Evaporative emission (EVAP) system – vent valve malfunction	Wiring, EVAP vent valve, EVAP breather valve/pressure sensor, hose blocked/leaking, ECM
0452	–	Evaporative emission (EVAP) system – pressure sensor malfunction	Wiring, EVAP pressure sensor, hose blocked/leaking, EVAP vent/control valve, EVAP canister, ECM
0453	–	Evaporative emission (EVAP) system – pressure sensor malfunction	Wiring, EVAP pressure sensor, hose blocked/leaking, EVAP vent/control valve, EVAP canister, ECM
0455	–	Evaporative emission (EVAP) system – large leak detected	Wiring, fuel tank, fuel filler cap, hose blocked/leaking, EVAP valve, EVAP canister, EVAP vent valve, BARO sensor, MAP/BARO switching valve, ECM
0456	–	Evaporative emission (EVAP) system – very small leak detected	Wiring, fuel tank, fuel filler cap, hose blocked/leaking, EVAP valve, EVAP canister, EVAP vent valve, BARO sensor, MAP/BARO switching valve, ECM
0460	–	Fuel tank level sensor – signal malfunction	Wiring open/short circuit, fuel tank level sensor
0461	–	Fuel tank level sensor – range/performance problem	Wiring, fuel tank level sensor



Flash type	EOBD type	Fault location	Probable cause
0462	–	Fuel tank level sensor – voltage low	Wiring, fuel tank level sensor
0463	–	Fuel tank level sensor – voltage high	Wiring, fuel tank level sensor
0500	–	Vehicle speed sensor (VSS) – circuit malfunction	Wiring, VSS, ECM
0505	–	Idle speed control (ISC) – malfunction	Wiring, Idle speed control (ISC), ECM
0506	–	Idle speed control (ISC) – engine rpm too low	Wiring, Idle speed control (ISC), ECM
0507	–	Idle speed control (ISC) – engine rpm too high	Wiring, Idle speed control (ISC), ECM
0510	–	Closed throttle position (CTP) switch – circuit malfunction	Wiring, CTP switch, ECM
0600	–	ECM/TCM – communication error	Wiring, ECM, TCM
0605	–	Engine control module (ECM) – malfunction	ECM
0650	–	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, ECM
0705	–	Park/neutral position (PNP) switch – circuit malfunction	Wiring, PNP switch, ECM
0710	–	Transmission fluid temperature sensor – voltage too low/high	Wiring, temperature sensor, TCM, ECM
0720	–	AT – vehicle speed sensor (VSS)	Wiring, VSS, TCM
0725	–	Engine speed (RPM) – incorrect signal voltage, ECM to TCM communication	Wiring, RPM sensor, TCM, ECM
0731	–	AT – first gear selection – malfunction	Transmission valve block
0732	–	AT – second gear selection – malfunction	Transmission valve block
0733	–	AT – third gear selection – malfunction	Transmission valve block
0734	–	AT – fourth gear selection – malfunction	Transmission valve block
0740	–	Torque converter clutch solenoid – voltage low	Wiring, torque converter clutch solenoid, TCM
0744	–	Torque converter lock-up solenoid – circuit malfunction	Wiring, clutch solenoid, TCM
0745	–	AT – Line pressure solenoid – voltage low	Wiring, line pressure solenoid, TCM
0750	–	AT – shift solenoid A – voltage low	Wiring, shift solenoid A, TCM
0755	–	AT – shift solenoid B – voltage low	Wiring, shift solenoid B, TCM
1065	P1065	Engine control module (ECM) – supply voltage	Wiring, ECM
1102	P1102	Mass air flow (MAF) sensor – range/performance problem	Wiring, MAF sensor, air leak, ECM
1111	P1111	Camshaft position (CMP) actuator – bank 1 – malfunction	Wiring, CMP actuator, ECM
1121	P1121	Throttle motor – malfunction	Throttle motor
1122	P1122	Throttle motor – range/performance problem	Wiring, throttle motor



**NISSAN**Model: Almera 1,5/1,8 • Almera Tino 1,8 • Primera 1,6/1,8/2,0  
X-Trail 2,0/2,5 • Navara Pick-up 2,4

Engine management/transmission

Flash type	EOBD type	Fault location	Probable cause
1124	P1124	Throttle motor relay – short circuit	Wiring, throttle motor relay
1126	P1126	Throttle motor relay – open circuit	Wiring, throttle motor relay
1128	P1128	Throttle motor – short circuit	Wiring, throttle motor
1130	P1130	Intake manifold air control solenoid – malfunction	Wiring, intake manifold air control solenoid, ECM
1131	P1131	Intake manifold air control solenoid – malfunction	Wiring, intake manifold air control solenoid, ECM
1136	P1136	Camshaft position (CMP) actuator – bank 2 – malfunction	Wiring, CMP actuator, ECM
1140	P1140	Valve timing sensor – bank 1 – range/performance problem	Wiring, valve timing sensor, ECM
1143	P1143	Heated oxygen sensor (HO2S) 1, bank 1 – lean shift monitoring	Wiring, HO2S, fuel system, injector, air leak, ECM
1144	P1144	Heated oxygen sensor (HO2S) 1, bank 1 – rich shift monitoring	Wiring, HO2S, fuel system, injector, ECM
1145	P1145	Valve timing sensor – bank 2 – range/performance problem	Wiring, valve timing sensor, ECM
1146	P1146	Heated oxygen sensor (HO2S) 2, bank 1 – minimum voltage monitoring	Wiring, HO2S, fuel system, injector, ECM
1147	P1147	Heated oxygen sensor (HO2S) 2, bank 1 – maximum voltage monitoring	Wiring, HO2S, fuel system, injector, ECM
1148	P1148	Closed loop control – bank 1 – inoperative	Wiring, front HO2S, ECM
1163	P1163	Heated oxygen sensor (HO2S) 1, bank 2 – lean shift monitoring	Wiring, HO2S, fuel system, injector, air leak, ECM
1164	P1164	Heated oxygen sensor (HO2S) 1, bank 2 – rich shift monitoring	Wiring, HO2S, fuel system, injector, ECM
1165	P1165	Intake manifold air control vacuum check switch – malfunction	Wiring, intake manifold air control solenoid, intake manifold air control vacuum check switch, ECM
1166	P1166	Heated oxygen sensor (HO2S) 2, bank 2 – minimum voltage monitoring	Wiring, HO2S, fuel system, injector, ECM
1167	P1167	Heated oxygen sensor (HO2S) 2, bank 2 – maximum voltage monitoring	Wiring, HO2S, fuel system, injector, ECM
1168	P1168	Closed loop control – bank 2 – inoperative	Wiring, front HO2S, ECM
1211	P1211	ABS control module – malfunction	Wiring, ABS control module
1212	P1212	ABS/TCS control module – communication error	Wiring, CAN data bus, ABS control module
1217	P1217	Engine over temperature condition	Wiring, engine coolant blower, coolant hoses, engine coolant thermostat, radiator, engine coolant temperature (ECT) switch
1223	P1223	Throttle position (TP) sensor 2 – voltage low	Wiring, TP sensor, ECM
1224	P1224	Throttle position (TP) sensor 2 – voltage high	Wiring, TP sensor, ECM
1225	P1225	Closed throttle position (CTP), learning procedure – voltage low	Throttle motor, TP sensor 1 & 2





Flash type	EOBD type	Fault location	Probable cause
1226	P1226	Closed throttle position (CTP), learning procedure - failed	Throttle motor, TP sensor 1 & 2
1227	P1227	Accelerator pedal position (APP) sensor 2 – voltage low	Wiring, APP sensor, ECM
1228	P1228	Accelerator pedal position (APP) sensor 2 – voltage high	Wiring, APP sensor, ECM
1229	P1229	Sensor supply voltage – short circuit	Wiring, APP sensor, TP sensor, MAF sensor, EVAP sensor, PS sensor, refrigerant sensor, ECM
1335	P1335	Crankshaft position (CKP) sensor 2 – circuit malfunction	Wiring, CKP sensor, ECM
1336	P1336	Crankshaft position (CKP) sensor 1 – rotor teeth damage	Wiring, CKP sensor, ECM
1400	P1400	Exhaust gas recirculation (EGR) system/ evaporative emission (EVAP) system – valve malfunction	Wiring, EGR valve, EVAP valve, ECM
1402	P1402	Exhaust gas recirculation (EGR) system – excessive flow detected	Wiring, EGR valve, EVAP valve, EGR valve, EGRT sensor, EGR back pressure transducer, ECM
1442	P1442	Evaporative emission (EVAP) system – small leak detected	Wiring, fuel tank, fuel filler cap, hose blocked/ leaking, EVAP valve, EVAP canister, EVAP vent valve, BARO sensor, MAP/BARO switching valve, ECM
1444	P1444	Evaporative emission (EVAP) system – control valve malfunction	Wiring, EVAP pressure sensor, hose blocked/ leaking, EVAP valve, EVAP canister, ECM
1446	P1446	Evaporative emission (EVAP) system – vent valve malfunction	Wiring, EVAP pressure sensor, hose blocked/ leaking, EVAP vent valve, EVAP canister contaminated, ECM
1448	P1448	Evaporative emission (EVAP) system – vent valve malfunction	Wiring, EVAP vent valve, EVAP pressure sensor, hose blocked/leaking, EVAP canister contaminated, EVAP vacuum cut valve, ECM
1456	P1456	Evaporative emission (EVAP) system – very small leak detected	Wiring, fuel tank, fuel filler cap, hose blocked/ leaking, EVAP valve, EVAP canister, EVAP vent valve, BARO sensor, MAP/BARO switching valve, ECM
1464	P1464	Fuel tank level sensor – voltage high	Wiring, fuel tank level sensor
1490	P1490	Evaporative emission (EVAP) system – bypass vacuum valve malfunction	Wiring, EVAP bypass/cut valve, hose blocked/ leaking, ECM
1491	P1491	Evaporative emission (EVAP) system – bypass vacuum valve malfunction	Wiring, EVAP vacuum cut/bypass valve, hose blocked/leaking, EVAP pressure sensor, EVAP vent valve, EVAP canister contaminated, ECM
1564	P1564	Cruise control master switch – malfunction	Wiring, cruise control master switch, ECM
1572	P1572	Cruise control brake pedal switch – circuit malfunction	Wiring, cruise control brake pedal switch, stop lamp switch, clutch pedal switch, ECM
1574	P1574	Cruise control vehicle speed sensor (VSS) – signal variation between two vehicle speed sensors	Wiring, CAN data bus, VSS, instrument panel, ECM
1605	P1605	TCM diagnosis communication line – malfunction	Wiring, TCM
1610	P1610	Ignition key/engine control module (ECM) – malfunction	Incorrect ignition key, ECM



**NISSAN**Model: Almera 1,5/1,8 • Almera Tino 1,8 • Primera 1,6/1,8/2,0  
X-Trail 2,0/2,5 • Navara Pick-up 2,4

Engine management/transmission

Flash type	EOBD type	Fault location	Probable cause
1611	P1611	Immobilizer control module/engine control module (ECM) – coding	Immobilizer control module/ECM incorrectly coded
1612	P1612	Immobilizer control module/engine control module (ECM) communication – malfunction	Wiring, immobilizer control module, ECM
1613	P1613	Engine control module (ECM), immobilizer function – internal failure	ECM
1614	P1614	Immobilizer control module/module coding plug communication – no signal	Wiring, immobilizer control module, module coding plug
1615	P1615	Ignition key/immobilizer control module communication – malfunction	Incorrect ignition key, immobilizer control module
1705	P1705	AT – throttle position (TP) sensor – voltage too low/high	Wiring, TP sensor, TCM, ECM
1706	P1706	Park/neutral position (PNP) switch – circuit malfunction	Wiring open/short circuit, PNP switch
1760	P1760	AT – overrun clutch solenoid – voltage low	Wiring, torque converter clutch solenoid, TCM
1800	P1800	Intake manifold air control solenoid – malfunction	Wiring, intake manifold air control solenoid, ECM
1805	P1805	Brake pedal position (BPP) switch – circuit malfunction	Wiring, BPP switch, ECM
1000	U1000	CAN data bus – no communication with other control modules	Wiring, ECM
1001	U1001	CAN data bus – no communication with other control modules	Wiring, ECM



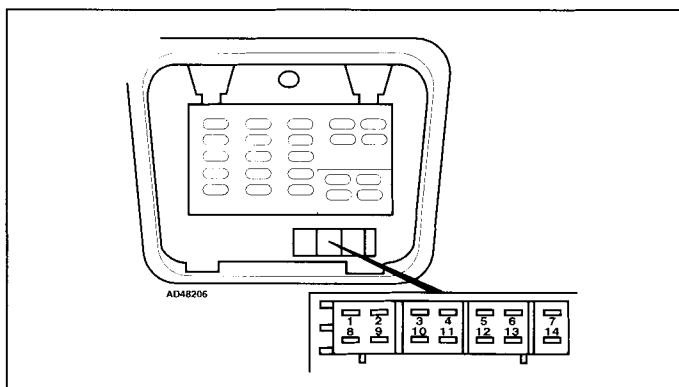
Model: Almera 2,0D • Primera 2,0TD • Terrano II 2,7TD  
 Year: 1996-00  
 Engine code: CD20E, CD20T, TD27Ti  
 System: Bosch EDC

**NISSAN**



Engine management

## Data link connector (DLC) locations



In fascia fusebox

## Trouble codes

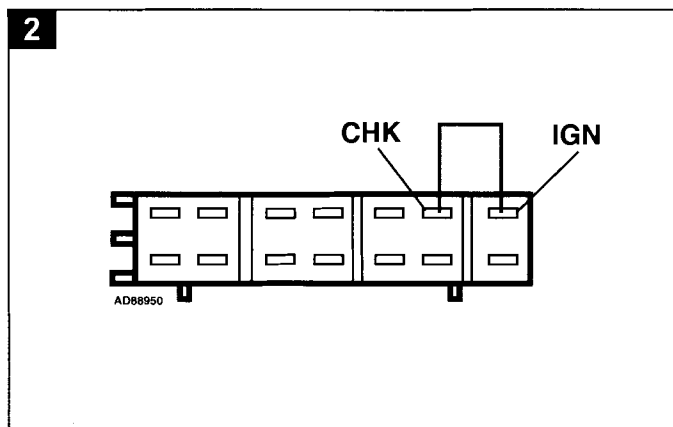
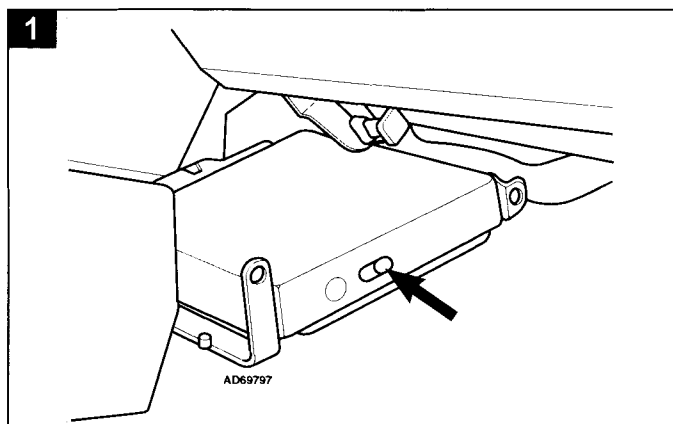
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).
- Switch ignition ON.
- Check that MIL illuminates.
- Start engine. Allow to idle.
- If MIL extinguishes: No trouble codes have been recorded.
- If MIL remains illuminated: Access trouble codes.

### Accessing

**NOTE:** Some models will also display trouble codes by the red LED in the ECM 1.

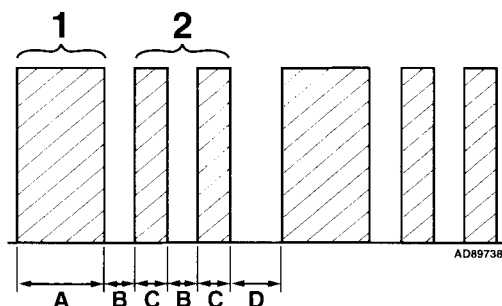
- Switch ignition ON.
- Bridge data link connector (DLC) terminals IGN and CHK 2.
- Wait 2 seconds.
- Disconnect bridge wire from data link connector (DLC) 2.
- Count MIL flashes. Compare with trouble code table.
- Long flashes indicate the 'tens' of the trouble code 3 [A].
- Short flashes indicate the 'units' of the trouble code 3 [C].
- A short pause separates each flash 3 [B].
- A long pause separates each trouble code 3 [D].
- For example: Trouble code 12 displayed 3.
- Switch ignition OFF. Rectify faults as necessary.





## Engine management

3



### Erasing

- Switch ignition ON.
- Bridge data link connector (DLC) terminals IGN and CHK **2**.
- Wait 2 seconds.
- Disconnect bridge wire from data link connector (DLC) **2**.
- Check that MIL flashes.
- Bridge data link connector (DLC) terminals IGN and CHK **2**.
- Wait 2 seconds.
- Disconnect bridge wire from data link connector (DLC) **2**.
- Switch ignition OFF.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

### Trouble code identification

Flash type	Fault location	Probable cause
11	Fuel injection pump position sensor – incorrect signal	Wiring open/short circuit, fuel injection pump position sensor
12	Mass air flow (MAF) sensor – circuit malfunction	Wiring open/short circuit, MAF sensor
13	Engine coolant temperature (ECT) sensor – circuit malfunction	Wiring open/short circuit, ECT sensor
14	Vehicle speed sensor (VSS) – circuit malfunction	Wiring open/short circuit, VSS
15	Fuel quantity adjuster position sensor – circuit malfunction	Wiring open/short circuit, fuel quantity adjuster position sensor
17	Module coding plug – circuit malfunction	Wiring open/short circuit, module coding plug
18	Fuel quantity adjuster/position sensor – malfunction	Wiring, supply voltage, fuel quantity adjuster/position sensor, ECM, fuel injection pump
21	Fuel injection timing solenoid/injector needle lift sensor – malfunction	Wiring, fuel injection timing solenoid, injector needle lift sensor, CKP sensor, air in fuel
22	Fuel quantity adjuster/position sensor – malfunction	Wiring, supply voltage, fuel quantity adjuster/position sensor, ECM, fuel injection pump
23	Accelerator pedal position (APP) switch – incorrect signal	Wiring open/short circuit, APP switch
25	Fuel quantity adjuster – circuit malfunction	Wiring, fuel quantity adjuster
27	Engine control module (ECM) – defective	ECM
28	Engine coolant blower motor – malfunction	Wiring, engine coolant blower motor, coolant system
31	Engine control module (ECM) – defective	ECM
34	Injector needle lift sensor – incorrect signal	Wiring, injector needle lift sensor, air in fuel
36	Fuel shut-off solenoid 1 – malfunction	Wiring open/short circuit, fuel shut-off solenoid
37	Fuel shut-off solenoid 1 – circuit malfunction	Wiring short circuit
38	Fuel shut-off solenoid 2 – malfunction	Wiring open circuit, ECM
42	Fuel temperature sensor – incorrect signal	Wiring open/short circuit, fuel temperature sensor
43	Accelerator pedal position (APP) sensor/accelerator pedal position (APP) switch – incorrect signal	Wiring open/short circuit, APP sensor/switch
47	Crankshaft position (CKP) sensor – incorrect signal	Wiring open/short circuit, CKP sensor

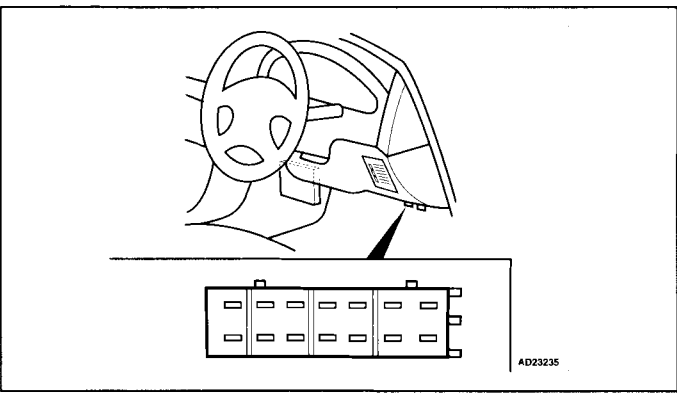


Flash type	Fault location	Probable cause
48	Accelerator pedal position (APP) switch/fuel injection pump position sensor – circuit malfunction	Wiring open/short circuit, APP switch, fuel injection pump position sensor, ECM
55	No fault found	–
82	Barometric pressure (BARO) sensor, in ECM – incorrect signal	ECM
83	Glow plug relay – circuit malfunction	Wiring open/short circuit, glow plug relay
84	Engine control module (ECM), reference voltage – incorrect	ECM
85	AC relay – circuit malfunction	Wiring open/short circuit, AC relay
86	Exhaust gas recirculation (EGR) solenoid – circuit malfunction	Wiring open/short circuit, EGR solenoid
87	Brake pedal position (BPP) switch I/II – circuit malfunction	Wiring open/short circuit, BPP switch
91	Engine control module (ECM) – defective	ECM
92	Engine control relay, shut-off time – too late	Wiring open/short circuit, engine control relay, ECM
93	Ignition switch/ECM voltage supply – circuit malfunction	Wiring short circuit
94	Fuel injection timing solenoid – circuit malfunction	Wiring open/short circuit, fuel injection timing solenoid
96	Engine control module (ECM)/injector needle lift sensor – incorrect signal	System voltage low, injector needle lift sensor, ECM
97	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring open/short circuit, MIL
98	Glow plug warning lamp – circuit malfunction	Wiring open/short circuit, glow plug warning lamp

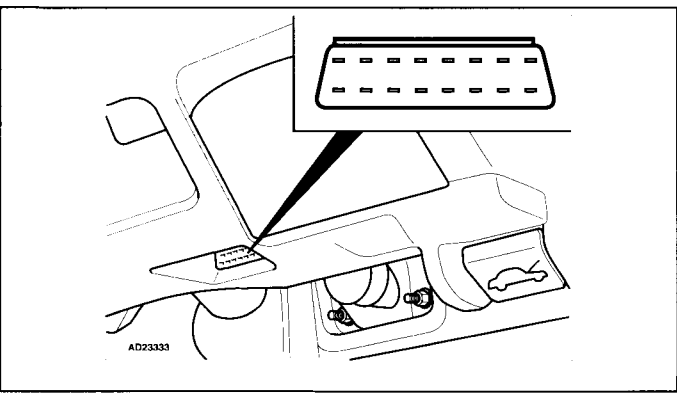




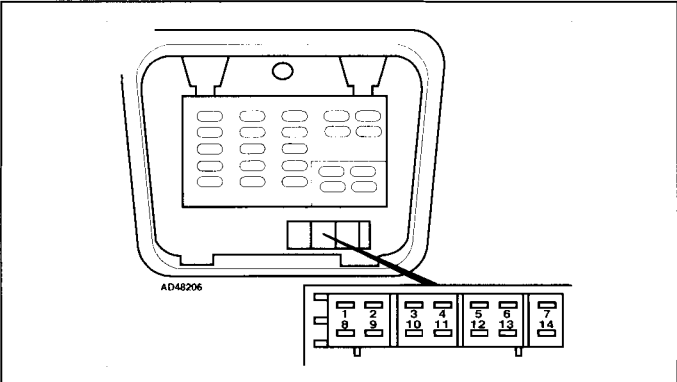
**Data link connector (DLC) locations**



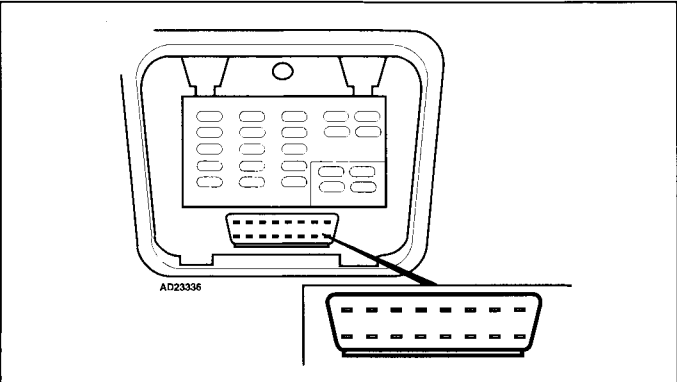
**Serena – under fascia fusebox**



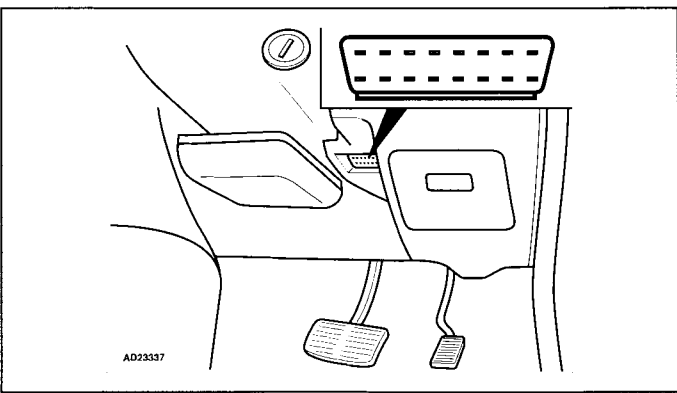
**Almera 1999 →**



**Except Serena →1999 – in fascia fusebox**



**Primera/Terrano II 1999 → – in fascia fusebox**



**Micra 1999 →**



## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- 1999 → Micra petrol models/Almera/Primera: Access engine control module (ECM) fault memory for immobilizer related trouble codes.

### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The immobilizer control module fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

### Trouble code identification

Fault location	Probable cause
Immobilizer control module – malfunction	Immobilizer control module
Engine control module (ECM) – malfunction	ECM
Immobilizer control module/engine control module (ECM) communication – malfunction	Wiring, immobilizer control module, ECM
Ignition key – no signal	Wiring, immobilizer control module
Immobilizer control module/engine control module (ECM) – coding	Immobilizer control module/ECM incorrectly coded
Ignition key/immobilizer control module communication – interference	Wiring
Engine control module (ECM), immobilizer/engine – malfunction	Immobilizer system, engine management system



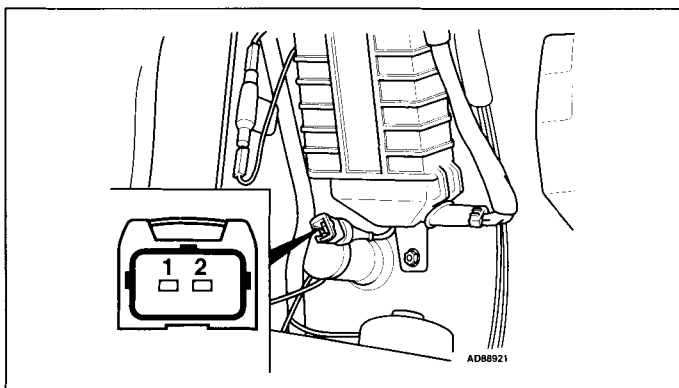


# PEUGEOT

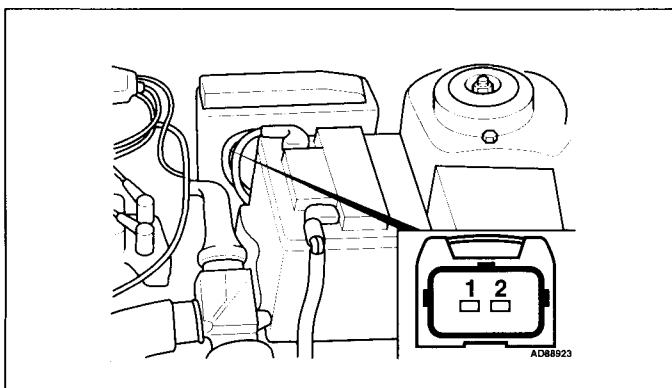
Model: 106 1,0/1,1/1,3/1,4/1,6 • 205 1,1/1,4/1,6 • 306 1,1/1,4/1,6/1,8/2,0 • 405 1,6/1,8/2,0 • 605 2,0 • Boxer 2,0  
Year: 1989-00  
Engine code: BD,YCD,YCDZ, HDZ, KDX, KD,YKDZ, KFX, K6B, LFZ, MFZ, NFW, NF,YNFZ, RFT, RFW, RFX, RF,YRFZ, RGX, RG,YRGZ  
System: Bosch Mono-Jetronic A2.2 • Bosch Mono-Motronic MA3.0 • Bosch Motronic MP3.1/3.2/5.1  
Magneti Marelli Monopoint G5/G6 • Magneti Marelli AP/8P/8P.11

## Engine management

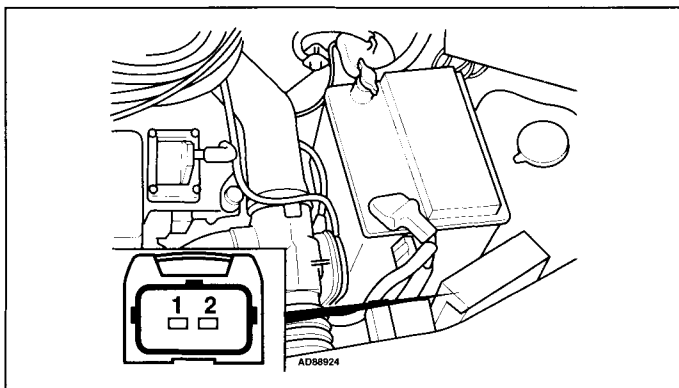
### Data link connector (DLC) locations



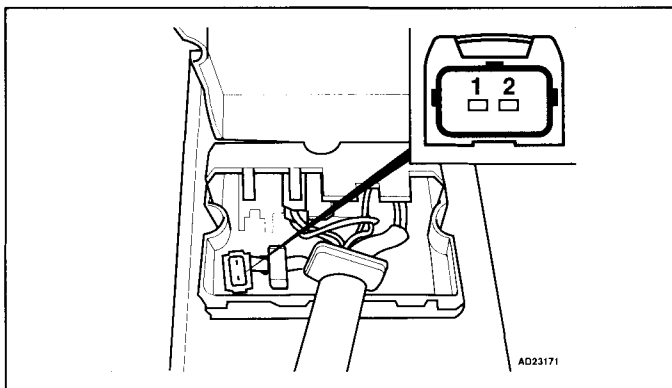
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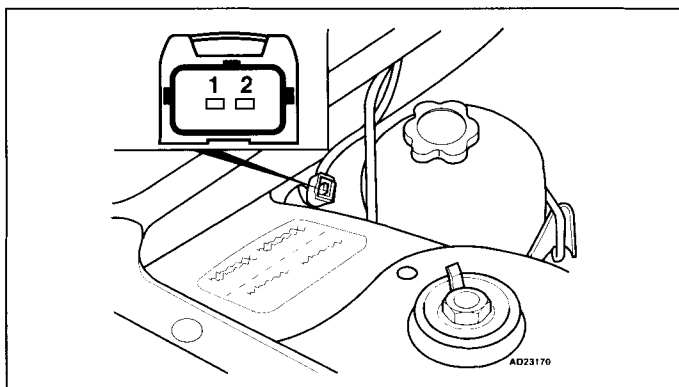
306



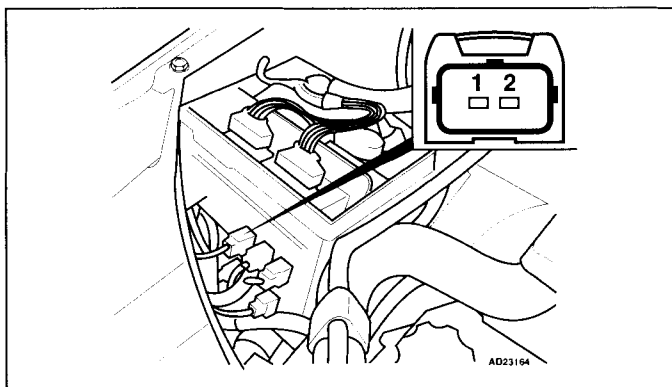
205 – position 1



405 – RH engine bay

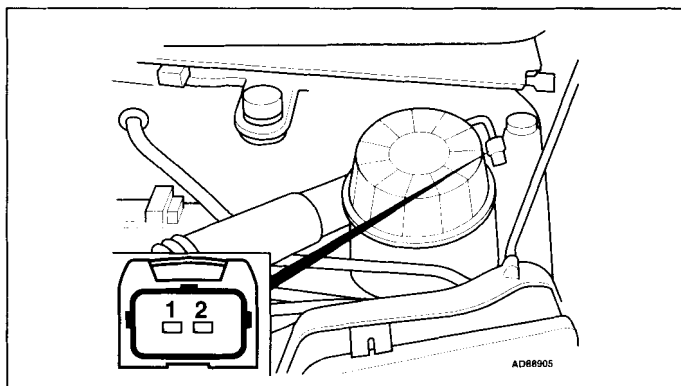


205 – position 2



605





Boxer

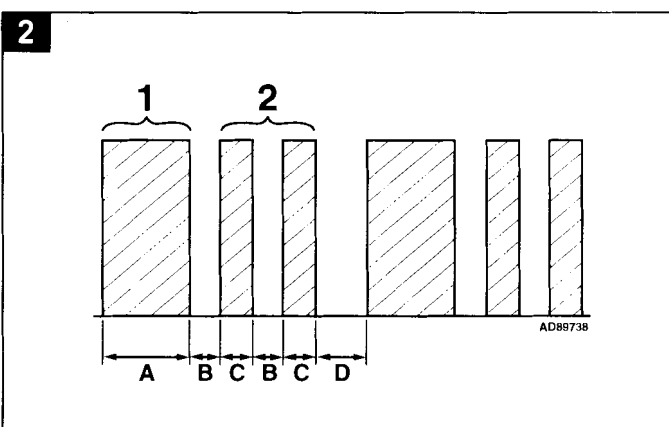
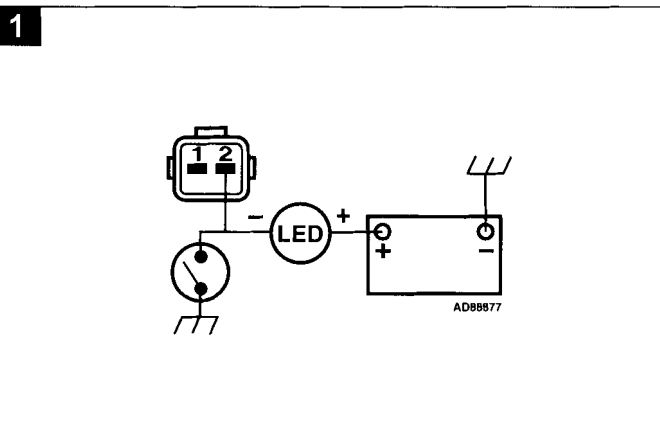
## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL) or LED.
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Vehicles fitted with a coded keypad: When switching on ignition or entering start code ensure diagnostic equipment is disconnected from the data link connector (DLC).

### Accessing

- Switch ignition ON.
- Check that MIL illuminates.
- Connect LED test lamp between green data link connector (DLC) terminal 2 and battery positive **1**.
- Bridge data link connector (DLC) terminal 2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Each trouble code consists of two groups of one or more flashes **2**.
- Long flashes indicate the 'tens' of the trouble code **2** [A].
- Short flashes indicate the 'units' of the trouble code **2** [C].
- A short pause separates each flash **2** [B].
- A long pause separates each trouble code **2** [D].
- For example: Trouble code 12 displayed **2**.
- Repeat operation.
- Count LED or MIL flashes. Note trouble codes. Compare with trouble code table.





## Engine management

### Erasing

#### Method 1

- Switch ignition ON.
- Connect LED test lamp between data link connector (DLC) terminal 2 and battery positive **1**.
- Bridge data link connector (DLC) terminal 2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Repeat switch operation until code 11 is displayed.
- Operate switch for 10-20 seconds.
- Switch ignition OFF.

#### Method 2

- Ensure ignition switched OFF.
- Disconnect battery earth lead for 10 seconds.

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

### Trouble code identification

Flash type	Fault location	Probable cause
11	End of sequence	–
12	Start of sequence	–
13	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
14	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
15	Relay module	Wiring, relay module – fuel pump contacts, ECM
18	Turbocharger (TC) coolant pump	Wiring, TC coolant pump, ECM
21 <b>1</b>	Closed throttle position (CTP) switch	Wiring, CTP switch, accelerator cable adjustment, ECM
21 <b>2</b>	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
22 <b>3</b>	Closed throttle position (CTP) switch	Wiring, CTP switch, accelerator cable adjustment, ECM
22 <b>4</b>	Idle air control (IAC) valve/idle speed control (ISC) actuator	Wiring, IAC valve/ISC actuator, ECM
25	Intake manifold air control solenoid	Wiring, intake manifold air control solenoid, ECM
27	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
31	Mixture control (MC)	Wiring, incorrect fuel, HO2S, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
32	Mixture control (MC)	Wiring, incorrect fuel, HO2S, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
33 <b>1</b>	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
33 <b>2</b>	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, hoses blocked/leaking, ECM
34	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
41	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
42 <b>5</b>	Injector(s)	Wiring, relay module, injector(s), ECM
42 <b>■</b>	Injector/fuel pump	Wiring, injector, fuel pump, relay module, ECM
43	Knock control	Wiring, KS, mechanical fault, incorrect fuel, ignition system, ECM
44	Knock sensor (KS)	Wiring, KS, ECM



Flash type	Fault location	Probable cause
45 <b>6</b>	Ignition coil 1 – cylinder 1	Wiring, ignition coil, ECM
45 <b>7</b>	Ignition coil 1 – cylinder 1 & 4	Wiring, ignition coil, ECM
46	Turbocharger (TC) wastegate regulating valve	Wiring, hoses blocked/leaking, TC wastegate regulating valve, ECM
47	Turbocharger (TC) wastegate regulation	TC wastegate regulating valve, MAP sensor, TP sensor, exhaust leak, intake leak
51	Heated oxygen sensor (HO2S)	Wiring, HO2S, exhaust leak, relay module, ECM
52	Mixture control (MC)	Wiring, incorrect fuel, HO2S, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
53	Battery voltage	Wiring, battery discharged, alternator
54	Engine control module (ECM)	Wiring, battery, ECM
56	Coded keypad	Wiring, coded keypad
57 <b>6</b>	Ignition coil 2 – cylinder 2	Wiring, ignition coil, ECM
57 <b>7</b>	Ignition coil 2 – cylinder 2 & 3	Wiring, ignition coil, ECM
58 <b>6</b>	Ignition coil 3 – cylinder 3	Wiring, ignition coil, ECM
59 <b>6</b>	Ignition coil 4 – cylinder 4	Wiring, ignition coil, ECM
61	Turbocharger (TC) regulating valve	Wiring, hoses blocked/leaking, TC regulating valve, ECM
65	Camshaft position (CMP) sensor	Wiring, CMP sensor, ECM
71 <b>6</b> <b>8</b>	Injector 1	Wiring, relay module, injector, ECM
72 <b>6</b> <b>8</b>	Injector 2	Wiring, relay module, injector, ECM
73 <b>6</b> <b>8</b>	Injector 3	Wiring, relay module, injector, ECM
74 <b>6</b> <b>■</b>	Injector 4	Wiring, relay module, injector, ECM
79 <b>9</b>	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, hoses blocked/leaking, ECM

- 1** Bosch Mono-Jetronic A2.2
- 2** Except Bosch Mono-Jetronic A2.2
- 3** Bosch Mono-Motronic MA3.0
- 4** All systems
- 5** Except Magneti Marelli AP/Bosch MP3.2
- 6** Magneti Marelli AP
- 7** Except Magneti Marelli AP
- 8** Bosch MP3.2
- 9** Turbo models





# PEUGEOT

Model: 106 1,0/1,1/1,4/1,6 • 206 1,1/1,4/1,6/2,0  
306 1,4/1,6/1,8/2,0 • 406 1,6/1,8/2,0  
406 Coupe 2,0 • 806 1,8/2,0 • Partner 1,4/1,8

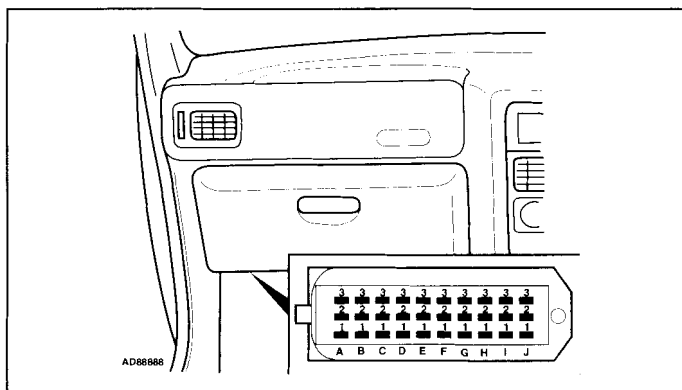
Year: 1995-04

Engine code: BFZ, CD,YCDZ, HD,YHDZ, HFX, HF,YHFZ, KFW,  
KFX, LFW, LFX, LF,YLFZ, NFT, NFU, NFW, NFX,  
NFZ, RFN, RFR, RFS, RFU, RFV, RGX, 6FZ

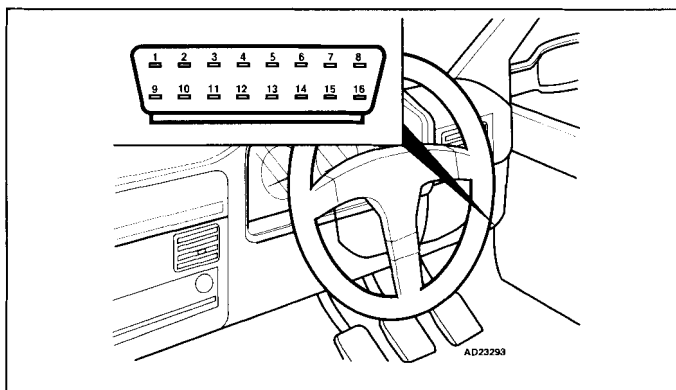
System: Bosch Mono-Motronic MA3.1  
Bosch Motronic MP3.2/5.1.1/5.2/7.2/7.3/7.4.4  
Magneti Marelli 1AP/1AP20/4.8P/4.8P2/8P/8P1A  
Sagem 4G/SL96/S2000

Engine management

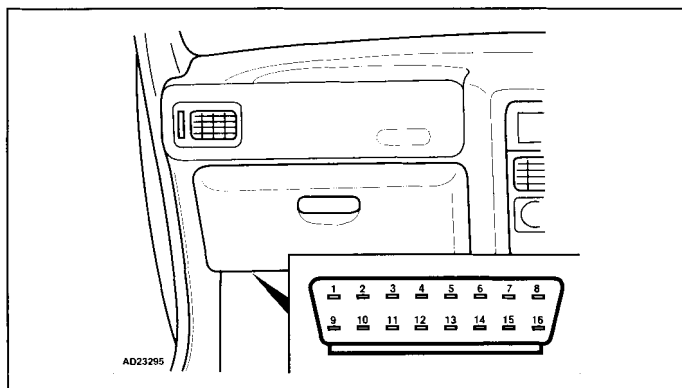
## Data link connector (DLC) locations



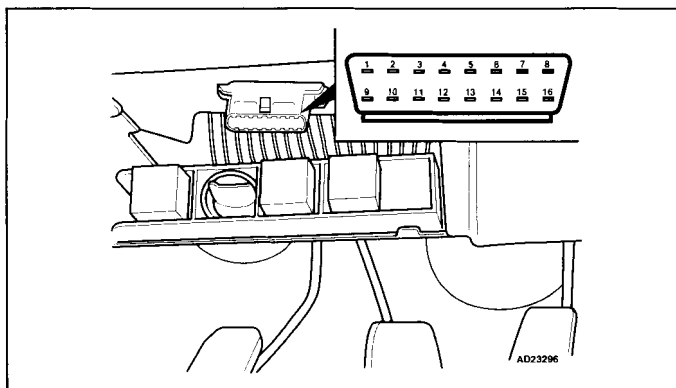
106 →1997



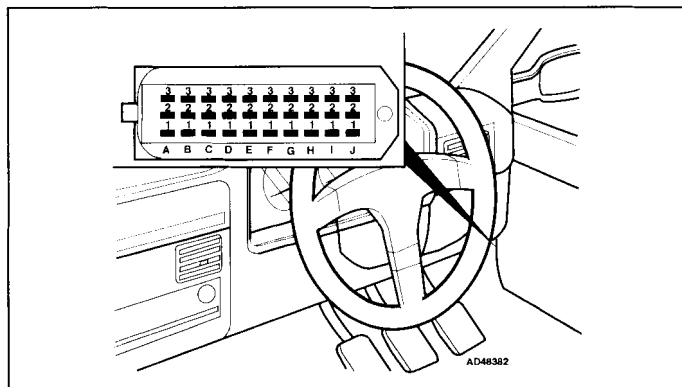
206, 806, Partner 1997 →



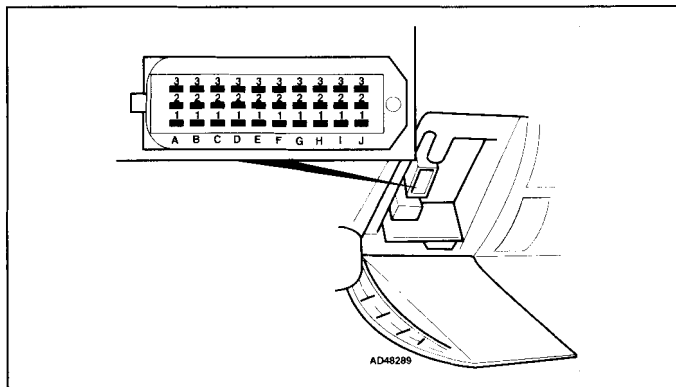
106 1997 →



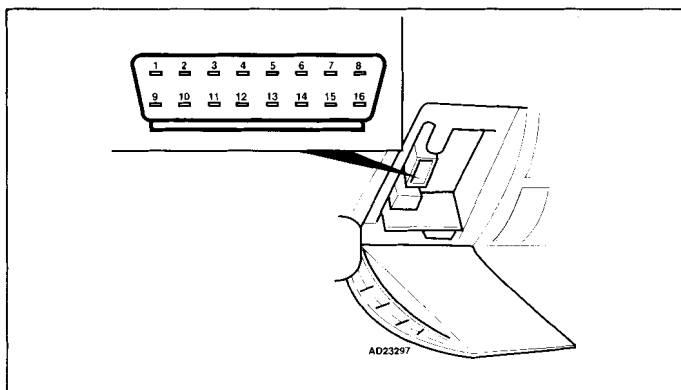
306



Partner →1997



406 →1997 - in fascia fusebox



406 1997 → – in fascia fusebox

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Vehicles fitted with a coded keypad: When switching on ignition or entering start code ensure diagnostic equipment is disconnected from the data link connector (DLC).

### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

### Trouble code identification

Fault location	Probable cause
G-force sensor (misfire monitor)	Wiring, G-force sensor, insecure sensor, ECM
AC compressor clutch relay	Wiring, AC compressor clutch relay, ECM
AC ON signal to multifunction control module	Wiring, ECM
Battery voltage	Wiring, battery discharged, alternator
Camshaft position (CMP) sensor	Wiring, CMP sensor, ECM
Catalytic converter	Catalytic converter
Closed throttle position (CTP) switch	Wiring, CTP switch, accelerator cable adjustment, ECM
Coolant temperature signal to multifunction control module	Wiring, ECM
Coolant temperature warning lamp signal to multifunction control module	Wiring, ECM
Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
Engine control module (ECM)	Wiring, battery, ECM
Engine control module (ECM) – programming	Incorrectly programmed, ECM
Engine coolant blower motor relay 1 – operation	Wiring, blower motor relay 1
Engine coolant blower motor relay 2 – operation	Wiring, blower motor relay 2
Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
Engine speed signal to multifunction control module	Wiring, ECM
Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid, ECM



**PEUGEOT**Model: 106 1,0/1,1/1,4/1,6 • 206 1,1/1,4/1,6/2,0 • 306 1,4/1,6/1,8/2,0  
406 1,6/1,8/2,0 • 406 Coupe 2,0 • 806 1,8/2,0 • Partner 1,4/1,8**Engine management**

<b>Fault location</b>	<b>Probable cause</b>
Exhaust gas recirculation (EGR) valve position sensor	Wiring, restricted/leaking EGR pipes, EGR valve, ECM
Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
Fuel pump control	Wiring, fuel pump, relay module, ECM
Heated oxygen sensor (HO2S) 1	Wiring, HO2S, exhaust leak, relay module, ECM
Heated oxygen sensor (HO2S) 1 – heater circuit	Wiring, HO2S heater, relay module, ECM
Heated oxygen sensor (HO2S) 2	Wiring, HO2S, exhaust leak, relay module, ECM
Heated oxygen sensor (HO2S) 2 – heater circuit	Wiring, HO2S heater, relay module, ECM
Idle air control (IAC) valve	Wiring, IAC valve, ECM
Idle speed control (ISC) actuator	Wiring, ISC actuator, ECM
Ignition coil 1 – cylinders 1 & 4	Wiring, ignition coil, ECM
Ignition coil 2 – cylinders 2 & 3	Wiring, ignition coil, ECM
Ignition coil 1	Wiring, ignition coil, ECM
Ignition coil 2	Wiring, ignition coil, ECM
Ignition coil 3	Wiring, ignition coil, ECM
Ignition coil 4	Wiring, ignition coil, ECM
Ignition misfire	Wiring, spark plugs, fuel quality, fuel level low, low compression, injector
Immobilizer – programming	Incorrect programming
Injector(s)	Wiring, injector(s), relay module, ECM
Injector 1	Wiring, injector, relay module, ECM
Injector 2	Wiring, injector, relay module, ECM
Injector 3	Wiring, injector, relay module, ECM
Injector 4	Wiring, injector, relay module, ECM
Injectors 1 & 4	Wiring, injector, relay module, ECM
Injectors 2 & 3	Wiring, injector, relay module, ECM
Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
Knock sensor (KS)	Wiring, KS, fuel quality, ignition timing, KS incorrectly tightened, low compression, ECM
Malfunction indicator lamp (MIL)	Wiring, MIL lamp, multifunction control module, ECM
Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, hoses blocked/leaking, ECM
Mixture control (MC)	Wiring, incorrect fuel, HO2S, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ECM
Power steering pressure (PSP) sensor/switch	Wiring, PSP switch/sensor, power steering pump, power steering system pressure, ECM
Secondary air injection (AIR) pump relay	Wiring, AIR pump relay, relay module, ECM
Secondary air injection (AIR) system	Wiring, AIR pump, AIR pump relay, hose connections, hoses blocked/leaking, ECM
Throttle position (TP) sensor	Wiring, TP sensor, ECM
Turbocharger (TC) wastegate regulating valve	Wiring, TC wastegate regulating valve, ECM
Vehicle speed sensor (VSS)	Wiring, VSS, ECM



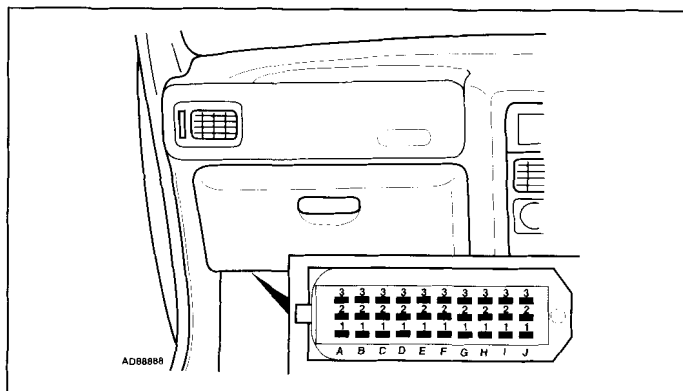
Model: 106 1,3/1,6 • 406 1,8/2,0 • 605 2,0 • 806 1,8/2,0  
 Year: 1994-00  
 Engine code: LFW, LFYMFZ, NFW, NFYRFU, RFV, RFZ, RGX, RGY  
 System: Magneti Marelli 8P  
 Bosch Motronic MP3.2/5.1/5.1.1/5.2

**PEUGEOT**

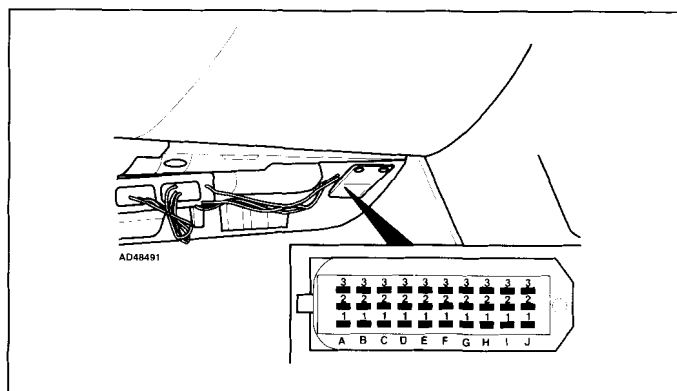


Engine management

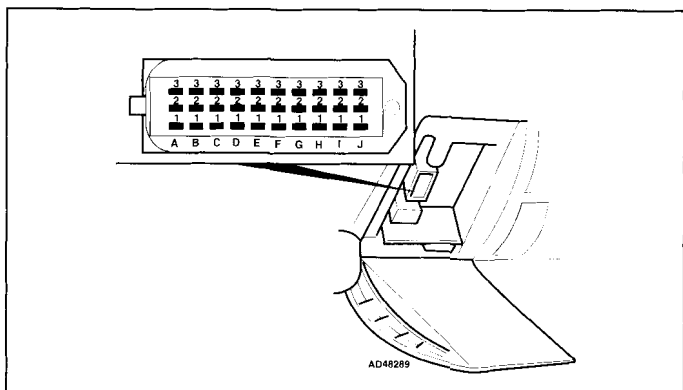
## Data link connector (DLC) locations



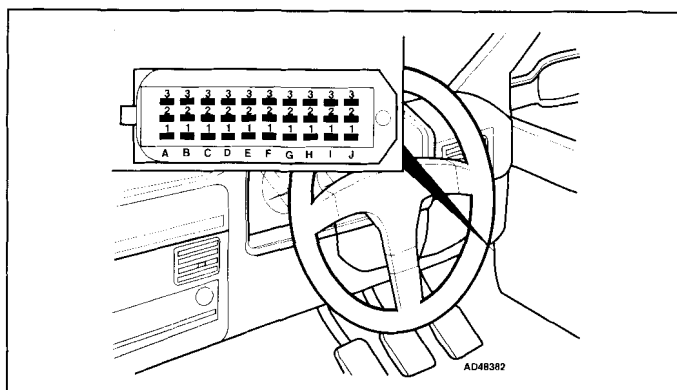
106



605



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806

## Trouble codes

### General information

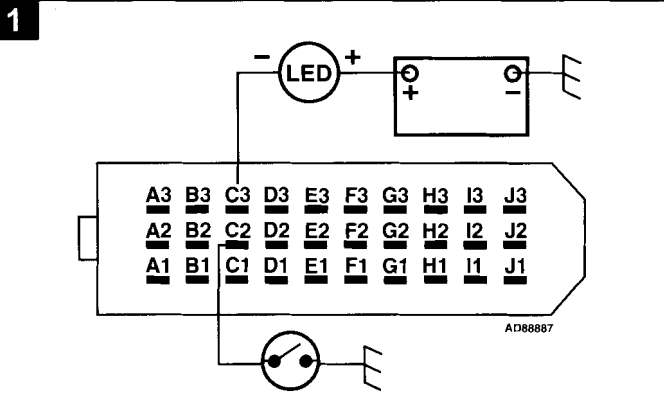
- ☐ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ☐ Trouble codes are displayed by the malfunction indicator lamp (MIL) or LED.
- ☐ The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- ☐ Vehicles fitted with a coded keypad: When switching on ignition or entering start code ensure diagnostic equipment is disconnected from the data link connector (DLC).

### Accessing

- Switch ignition ON.
- Check that MIL illuminates.
- Connect LED test lamp between data link connector (DLC) terminal C3 and battery positive **1**.
- Bridge data link connector (DLC) terminal C2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code **12**.
- Each trouble code consists of two groups of one or more flashes **2**.
- Long flashes indicate the 'tens' of the trouble code **2** [A].
- Short flashes indicate the 'units' of the trouble code **2** [C].
- A short pause separates each flash **2** [B].
- A long pause separates each trouble code **2** [D].
- For example: Trouble code 12 displayed **2**.
- Repeat operation. Note trouble codes.
- Compare with trouble code table. Rectify faults as necessary.



## Engine management



### Erasing

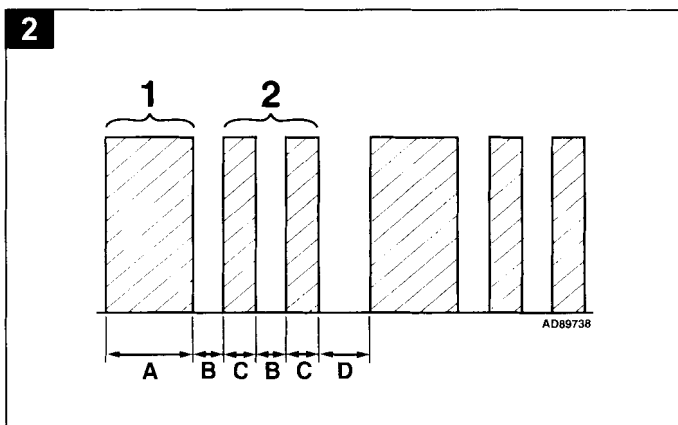
#### Method 1

- Switch ignition ON.
- Connect LED test lamp between data link connector (DLC) terminal C3 and battery positive **1**.
- Bridge data link connector (DLC) terminal C2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Repeat switch operation until code 11 is displayed.
- Operate switch for 10-20 seconds.
- Switch ignition OFF.

#### Method 2

- Ensure ignition switched OFF.
- Disconnect battery earth lead for 10 seconds.

**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).



### Trouble code identification

Flash type	Fault location	Probable cause
11	End of sequence	–
12	Start of sequence	–
13	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
14	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
15	Relay module	Wiring, relay module – fuel pump contacts, ECM
21	Throttle position (TP) sensor	Wiring, TP sensor, accelerator cable adjustment, ECM
22	Idle air control (IAC) valve	Wiring, IAC valve, ECM
25	Intake manifold air control solenoid	Wiring, intake manifold air control solenoid, ECM
27	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
31	Mixture control (MC)	Wiring, incorrect fuel, HO2S, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
32	Mixture control (MC)	Wiring, incorrect fuel, HO2S, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
33	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, hoses blocked/leaking, ECM





Flash type	Fault location	Probable cause
34	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve, ECM
41	Crankshaft position (CKP) sensor/ engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
42 <sup>1</sup>	Injectors	Wiring, relay module, injectors, ECM
43	Knock control	Wiring, KS, mechanical fault, incorrect fuel, ignition system, ECM
44	Knock sensor (KS)	Wiring, KS, ECM
45	Ignition coil 1 – cylinders 1 & 4	Wiring, ignition coil, ECM
46	Turbocharger (TC) wastegate regulating valve	Wiring, hoses blocked/leaking, TC wastegate regulating valve, ECM
47	Turbocharger (TC) wastegate regulation	TC wastegate regulating valve, MAP sensor, TP sensor, exhaust leak, intake leak
51	Heated oxygen sensor (HO2S)	Wiring, HO2S, exhaust leak, relay module, ECM
52	Mixture control (MC)	Wiring, incorrect fuel, HO2S, exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
53	Battery voltage	Wiring, battery discharged, alternator
54	Engine control module (ECM)	Wiring, battery, ECM
56	Coded keypad	Wiring, coded keypad
57	Ignition coil 2 – cylinders 2 & 3	Wiring, ignition coil, ECM
65	Camshaft position (CMP) sensor	Wiring, CMP sensor, ECM
71 <sup>2</sup>	Injector 1	Wiring, relay module, injector, ECM
72 <sup>2</sup>	Injector 2	Wiring, relay module, injector, ECM
73 <sup>2</sup>	Injector 3	Wiring, relay module, injector, ECM
74 <sup>2</sup>	Injector 4	Wiring, relay module, injector, ECM

<sup>1</sup> Except Bosch Motronic MP3.2<sup>2</sup> Bosch Motronic MP3.2

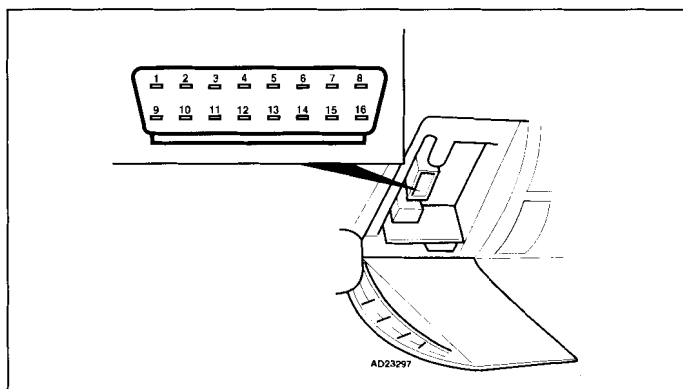


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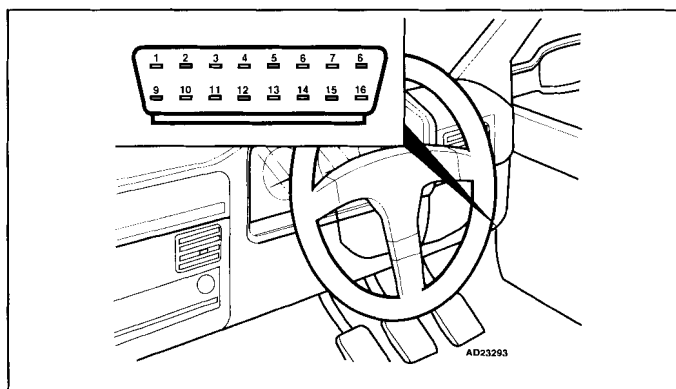
Model: 206 1,4 • Partner 1,4 • 406 1,8  
Year: 2002-04  
Engine code: KfV, KfW, 6FZ  
System: Sagem S2000 PM1

## Engine management

### Data link connector (DLC) locations



206, 406 – in fascia fusebox



Partner

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1108	Manifold absolute pressure (MAP) sensor – circuit intermittent	Wiring, poor connection, MAP sensor, ECM
P1109	Manifold absolute pressure (MAP) sensor – circuit intermittent	Wiring, poor connection, MAP sensor, ECM
P1110	Manifold absolute pressure (MAP) sensor – circuit intermittent	Wiring, poor connection, MAP sensor, ECM
P1100	Exhaust gas recirculation (EGR) system – range/performance problem	Wiring, EGR valve/solenoid, hose leak/blockage
P1111	Exhaust gas recirculation (EGR) – circuit malfunction	Wiring, EGR valve/solenoid
P1121	Engine control module (ECM) – processor fault	ECM



<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1152	Throttle motor position sensor 1/2 – correlation	Wiring, throttle motor position sensor 1/2, accelerator pedal position (APP) sensor
P1157	Throttle motor position sensor 2 – signal	Wiring, throttle motor position sensor 2, throttle motor, mechanical fault
P1158	Throttle motor position sensor 2 – signal	Wiring, throttle motor position sensor 2, throttle motor, mechanical fault
P1186	Mixture control (MC)	Wiring, incorrect fuel, heated oxygen sensor (HO2S), exhaust leak, fuel pressure, injector control, EVAP canister purge valve, compression, air filter blocked, ignition system, ECM
P1280	Throttle motor position sensor 1/2 – position check	Wiring, throttle motor position sensor 1/2, throttle motor
P1327	Ignition coil, camshaft position (CMP) sensor – control circuit	Wiring, ignition coil, CMP sensor, ECM
P1511	Supply voltage	Wiring, alternator, battery discharged, multifunction control module
P1526	Alternator – circuit	Wiring, alternator, battery discharged, multifunction control module
P1536	Brake pedal position (BPP) switch – plausibility	Wiring, BPP switch, multifunction control module, mechanical fault
P1543	Air conditioning (AC) – request signal	Wiring, multifunction control module, AC refrigerant pressure sensor, AC control module
P1601	Relay module – control circuit	Wiring, relay module, multifunction control module
P1608	Engine hot lamp output – circuit malfunction	Wiring, engine hot lamp, ECM
P1621	Engine control module (ECM) – internal fault	ECM
P1626	Transmission control system – implausible signal	Wiring, transmission control module (TCM), multifunction control module, mechanical fault
P1631	Engine control module (ECM) – processor fault	ECM
P1794	Electronic stability programme (ESP), ABS control system – no communication	Wiring, electronic stability program (ESP) control module, ABS control module, multifunction control module
U1000	Controller area network (CAN) data bus, ECM – no communication	Wiring, CAN data bus
U1003	Controller area network (CAN) data bus – no communication	Wiring, CAN data bus
U1109	Controller area network (CAN) data bus, transmission control system – no communication	Wiring, CAN data bus, transmission control module (TCM), multifunction control module
U1117	Controller area network (CAN) data bus, suspension – no communication	Wiring, electronic stability program (ESP) control module, CAN data bus
U1118	Controller area network (CAN) data bus, multifunction control module – no communication	Wiring, multifunction control module, CAN data bus



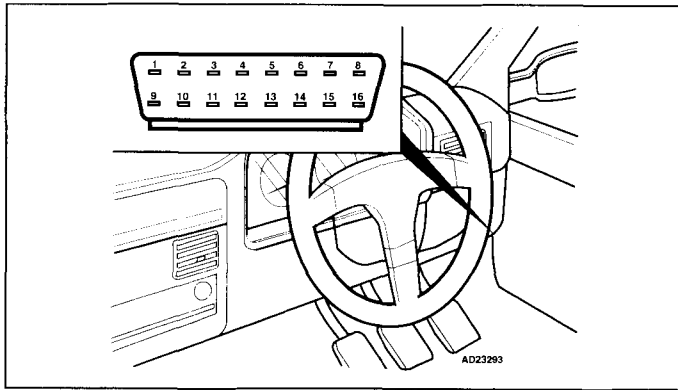


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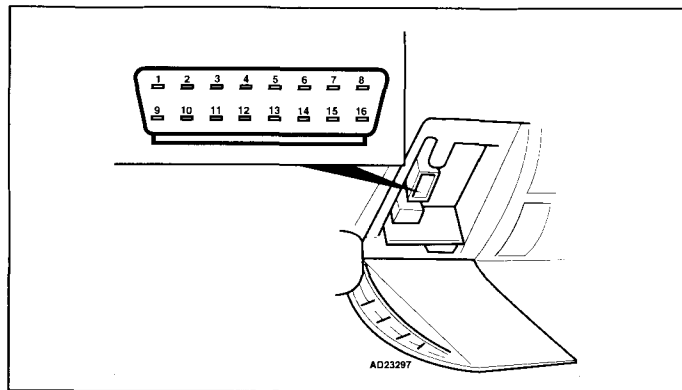
Model: 206 1,4/2,0 HDi • 306 2,0 HDi • 406 2,0/2,2 HDi  
806 2,0 HDi • Partner 2,0 HDi  
Year: 1998-04  
Engine code: 4HZ, 8HX, RHS, RHW, RHYRHZ  
System: Bosch EDC 15C2 • Bosch EDC 16

Engine management

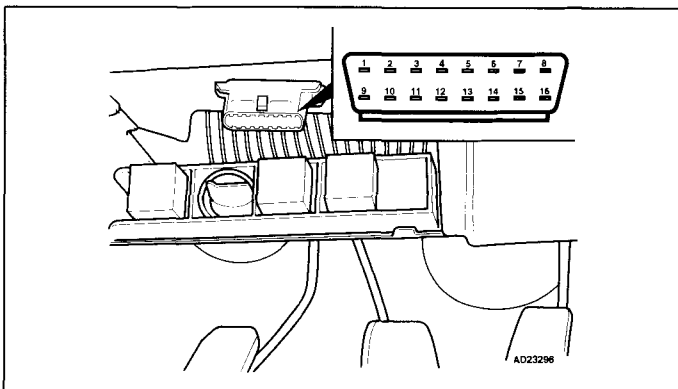
## Data link connector (DLC) locations



206, 806, Partner



406 – in fascia fusebox



306

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).



## Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1101	Barometric pressure (BARO) sensor	Incorrectly programmed ECM, EEPROM error, ECM
P1108	Engine coolant blower motor relay 1 – operation	Wiring, blower motor relay 1
P1109	Engine coolant blower motor relay 2 – operation	Wiring, blower motor relay 2
P1110	Air conditioning	Wiring, AC temperature sensors control module, AC control module, multifunction control module, ECM
P1112	Fuel pressure – control	Wiring, fuel system pressure sensor, fuel pressure control solenoid, fuel system, ECM
P1135	3rd piston cut-off solenoid	Wiring, 3rd piston cut-off solenoid, ECM
P1138	Fuel pressure control solenoid	Wiring, fuel pressure control solenoid, ECM
P1169	Engine control module (ECM) – injector control – capacitor 1	Wiring, ECM
P1170	Engine control module (ECM) – injector control – capacitor 2	Wiring, ECM
P1171	Engine control module (ECM) – extended engine stop	Wiring, relay module, ECM
P1402	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid, ECM
P1403	Engine coolant heater	Wiring, engine coolant heater relay, ECM
P1404	Engine control module (ECM) – glow plug control module/engine coolant heater relay – control	Wiring, glow plug control module, engine coolant heater relay, ECM
P1408	Engine coolant heater – control	Wiring, incorrectly programmed ECM, battery, EEPROM error
P1511	Engine control module (ECM) – supply voltage	Wiring, battery, ignition switch, ECM
P1517	Alarm system/central locking control module – programming	Wiring, incorrectly programmed
P1519	Engine control module (ECM) – engine coolant blower motor control	Wiring, engine coolant blower motor relay, ECM
P1521	Clutch pedal position (CPP) switch	Wiring, CPP switch, VSS, ECM
P1606	Malfunction indicator lamp (MIL)	Wiring, MIL, ECM
P1614	Engine control module (ECM) – sensor reference voltage incorrect	Wiring, ECM
P1614	Engine control module (ECM) – CMP sensor reference voltage incorrect	Wiring, ECM



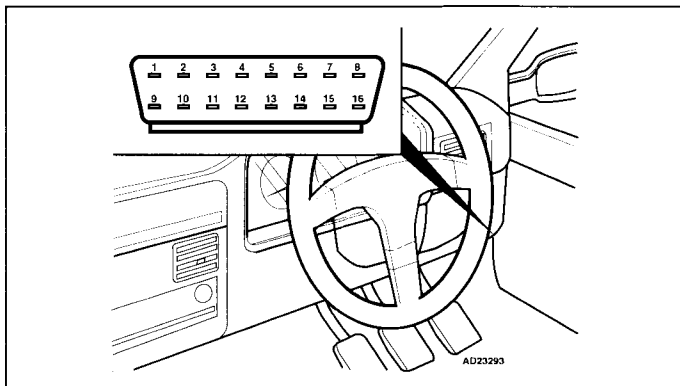


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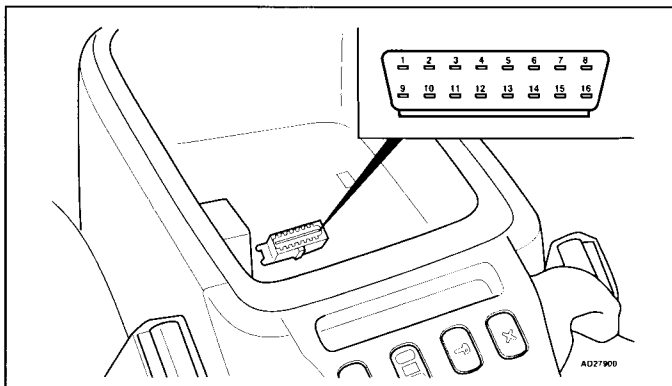
Model: 307 2,0 • 406 2,0/2,2 • 607 2,0/2,2 • 807 2,0/2,2  
Year: 2002-04  
Engine code: RFN, RFM, 3FZ  
System: Magneti Marelli 4MP2.03/04/05/18  
Magneti Marelli 6LP1.03/04/05/06/08/23/6LP3.07

## Engine management

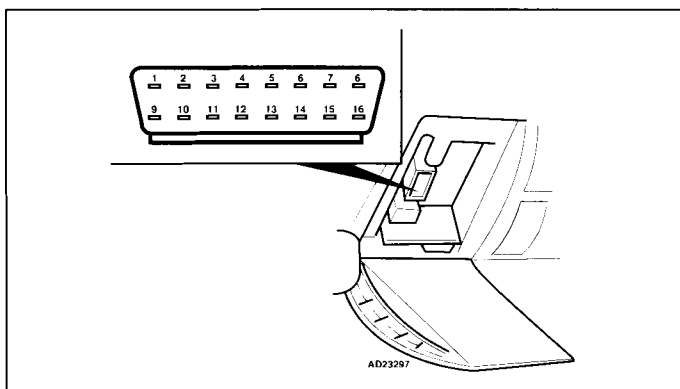
### Data link connector (DLC) locations



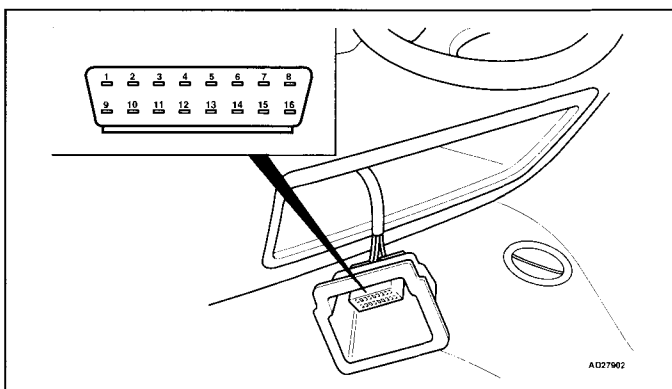
307



607 – centre console



406 – in fascia fusebox



807 – fascia, driver's side

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P0	Refer to EOBD trouble code table	–
P1110	Air conditioning (AC) – request signal	Wiring, multifunction control module, AC refrigerant pressure sensor
P1112	Throttle motor position sensor 1/2 – position check	Wiring, throttle motor position sensor 1/2, throttle motor
P1133	Throttle motor position sensor 1, manifold absolute pressure (MAP) sensor – correlation	Wiring, throttle motor position sensor 1, MAP sensor, throttle motor, mechanical fault
P1134	Throttle motor position sensor 2, manifold absolute pressure (MAP) sensor – correlation	Wiring, throttle motor position sensor 2, throttle motor, mechanical fault
P1135	Intake manifold	–
P1147	Camshaft position (CMP) actuator	Wiring, camshaft position (CMP) actuator, mechanical fault
P1148	Camshaft position (CMP) actuator	Wiring, camshaft position (CMP) actuator, mechanical fault
P1149	Camshaft position (CMP) actuator	Wiring, camshaft position (CMP) actuator, mechanical fault
P1150	Throttle motor – control	Wiring, throttle motor, throttle motor position sensor 1/2, accelerator pedal position (APP) sensor
P1151	Throttle motor – control	Wiring, throttle motor, throttle motor position sensor 1/2, accelerator pedal position (APP) sensor
P1152	Throttle motor position sensor 1/2 – correlation	Wiring, throttle motor position sensor 1/2, accelerator pedal position (APP) sensor
P1153	Throttle motor position sensor 1/2 – initialization of butterfly stops	Wiring, throttle motor position sensor 1/2, mechanical fault, throttle motor
P1154	Throttle motor – control	Wiring, throttle motor, throttle motor position sensor 1/2, accelerator pedal position (APP) sensor
P1155	Throttle motor – control	Wiring, throttle motor, throttle motor position sensor 1/2, accelerator pedal position (APP) sensor
P1156	Throttle motor position sensor 1 – signal	Wiring, throttle motor position sensor 1, throttle motor, mechanical fault
P1157	Throttle motor position sensor 1 – signal	Wiring, throttle motor position sensor 1, throttle motor, mechanical fault
P1158	Throttle motor position sensor 1 – signal	Wiring, throttle motor position sensor 1, throttle motor, mechanical fault
P1160	Intake manifold	–
P1454	Exhaust gas recirculation (EGR) system – range/performance problem	Wiring, hose leak/blockage, EGR valve/solenoid
P1461	Exhaust gas recirculation (EGR) valve position sensor – initialization	Wiring, EGR valve position sensor, mechanical fault
P1462	Exhaust gas recirculation (EGR) valve position sensor – initialization	Wiring, EGR valve position sensor, mechanical fault
P1507	Engine coolant blower motor, rationality check – malfunction	Wiring, engine coolant blower motor, ECM
P1517	Immobilizer – programming	Incorrect programming, immobilizer transponder, multifunction control module, combination switch
P1519	Engine coolant blower motor, power/earth – circuit malfunction	Wiring, engine coolant blower motor, ECM
P1543	Air conditioning (AC) – request signal	Wiring, multifunction control module, AC refrigerant pressure sensor

**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1555	Exhaust gas recirculation (EGR) system – range/performance problem	Wiring, hose leak/blockage, EGR valve/solenoid
P1603	Engine coolant temperature (ECT) sensor – range/performance problem	Wiring, ECT sensor, multifunction control module
P1608	Engine hot lamp output – circuit malfunction	Wiring, engine hot lamp, ECM
P1610	Fuel consumption signal	Wiring, trip computer, ECM
P1612	Immobilizer – memorization	Incorrect programming, immobilizer transponder, multifunction control module
P1614	Engine control module (ECM) – sensor supply	Wiring, ECM
P1617	Engine control module (ECM) – processor fault	ECM
P1621	Engine control module (ECM) – internal fault	ECM
P1622	Throttle motor position sensor/manifold absolute pressure (MAP) sensor – correlation	Wiring, throttle motor position sensor 1, MAP sensor, throttle motor, mechanical fault
P1623	Engine torque delivered	–
P1624	Electronic stability programme (ESP) – incorrect signal	Wiring, electronic stability program (ESP) control module, multifunction control module
P1625	Electronic stability programme (ESP) – incorrect signal	Wiring, electronic stability program (ESP) control module, multifunction control module
P1626	Transmission control system – implausible signal	Wiring, transmission control module (TCM), multifunction control module, mechanical fault
P1627	Non respect of torque demanded by driver	–
P1628	Brake pedal position (BPP) switch, accelerator pedal position (APP) sensor – correlation	Wiring, BPP switch, APP sensor, multifunction control module, mechanical fault
P1629	Calculated mechanical friction/actual friction – correlation	–
P1630	Cruise control system – implausible signal	Wiring, combination switch, multifunction control module
P1631	Engine control module (ECM) – processor fault	ECM
U1000	Controller area network (CAN) data bus, ECM – no communication	Wiring, CAN data bus
U1003	Controller area network (CAN) data bus – no communication	Wiring, CAN data bus
U1109	Controller area network (CAN) data bus, transmission control module (TCM) – no communication	Wiring, CAN data bus
U1113	Controller area network (CAN) data bus, ECM/ESP – no communication	Wiring, CAN data bus
U1117	Controller area network (CAN) data bus, suspension – no communication	Wiring, CAN data bus
U1118	Controller area network (CAN) data bus, multifunction control module – no communication	Wiring, CAN data bus
U1209	Controller area network (CAN) data bus, transmission control module (TCM) – no communication	Wiring, CAN data bus
U1213	Controller area network (CAN) data bus, ECM/ESP – no communication	Wiring, CAN data bus
U1217	Controller area network (CAN) data bus, suspension – no communication	Wiring, CAN data bus
U1218	Controller area network (CAN) data bus, multifunction control module – no communication	Wiring, CAN data bus





Model: 406 2,1D Turbo • 605 2,1D Turbo  
806D 2,1 Turbo

Year: 1994-00

Engine code: P8C

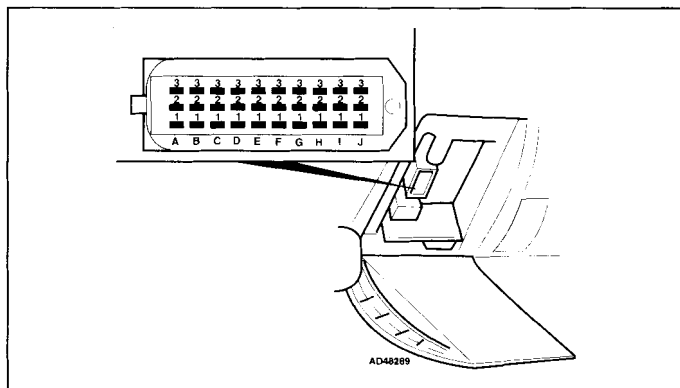
System: Lucas EPIC

**PEUGEOT**

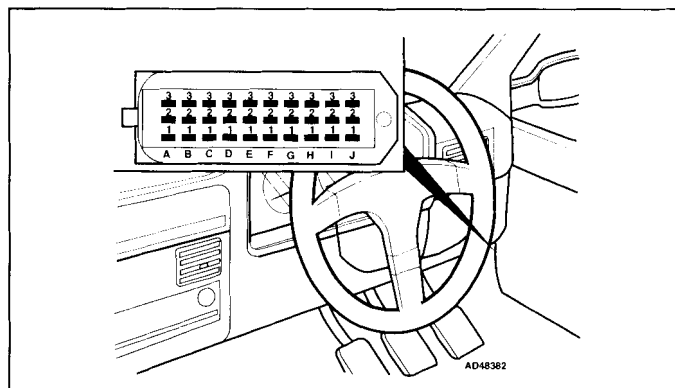


Engine management

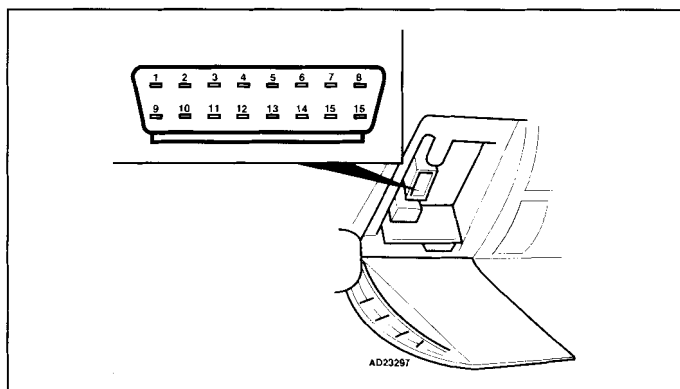
## Data link connector (DLC) locations



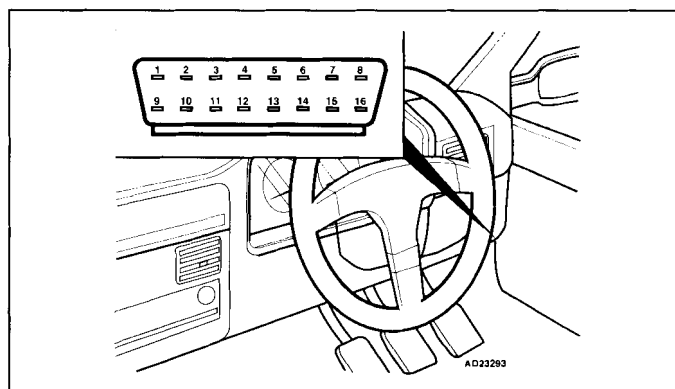
406 →1997 – in fascia fusebox



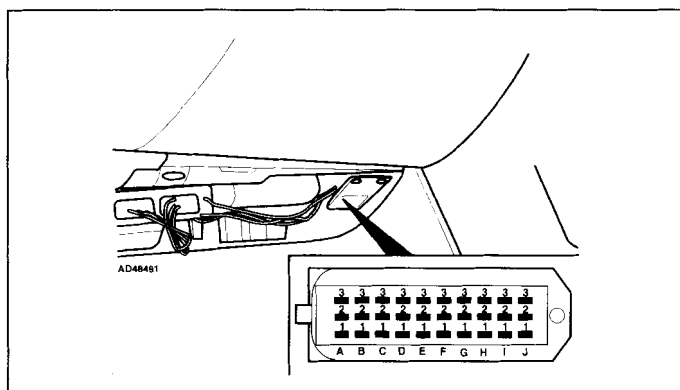
806 →1997



406 1997 → – in fascia fusebox



806 1997 →



605



### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Vehicles fitted with a coded keypad: When switching on ignition or entering start code ensure diagnostic equipment is disconnected from the data link connector (DLC).

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).
- The following scanner codes are applicable to the fuel system manufacturer's test equipment, similar and more detailed fault diagnosis information can be obtained using the vehicle manufacturer's or equivalent test equipment.

#### Trouble code identification

Scanner type	Fault location	Probable cause
100	Engine control module (ECM) – memory	ECM
101	Engine control module (ECM) – low voltage during starting	Battery, relay module, wiring, ECM
102	Engine control module (ECM) – non-volatile memory fault	ECM
104	Engine control module (ECM) – analogue/digital converter	Wiring, ECM
105	Engine control module (ECM) – sensor reference voltage incorrect	Wiring, ECM
130	Engine control module (ECM) – memory locked	Coded keypad, ECM
150	Battery voltage	Wiring, IFS switch, relay module, battery, alternator, ECM
151	Battery voltage	Wiring, IFS switch, relay module, battery discharged, alternator
152	Relay module	Wiring, relay module, ECM
200	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
210	Intake air temperature (IAT) sensor	Wiring, IAT sensor, ECM
211	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
220	Fuel temperature sensor	Wiring, fuel temperature sensor, ECM
240	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
250	Crankshaft position (CKP) sensor	Wiring, CKP sensor, air gap, ECM
290	Accelerator pedal position (APP) sensor	Wiring, APP sensor, ECM
291	Accelerator pedal position (APP) sensor/brake pedal position (BPP) switch – signal conflict	Wiring, APP sensor, BPP switch, brake pedal applied whilst throttle fully depressed, accelerator pedal tight/sticking, ECM
300	Brake pedal position (BPP) switch	Wiring, BPP switch, ECM
320	Cruise control	Wiring, cruise control master switch, ECM
329	Transmission range (TR) switch	Wiring, TR switch



Scanner type	Fault location	Probable cause
340	Air conditioning	Wiring, AC compressor clutch relay, AC control module, ECM
350	Glow plug control module – pre-/post-heat control	Wiring, glow plug control module, ECM
361	Tachometer signal	Wiring, tachometer, ECM
363	Fuel consumption signal	Wiring, trip computer, ECM
600	Fuel injection pump – rotor position monitoring	Wiring, fuel system, fuel quantity adjuster, fuel injection pump, relay module, ECM
601	Fuel injection pump – rotor position	Wiring, shield wiring, injection pump cam ring position sensor, injection pump rotor position sensor, fuel injection pump, ECM
602	Fuel injection pump – rotor calibration	Wiring, fuel injection pump, ECM
603	Fuel injection pump – rotor minimum calibration	Fuel injection pump
604	Fuel delivery/needle lift signal	Wiring, fuel injection pump, ECM
605	Fuel injection pump – delivery calibration	Wiring, injection pump calibration resistor, fuel injection pump, ECM
650	Fuel shut-off solenoid	Wiring, relay module, coded keypad, fuel shut-off solenoid, fuel injection pump, ECM
700	Fuel injection pump – cam position monitoring	Wiring, fuel injection timing solenoid, fuel injection pump, relay module, ECM
701	Fuel injection pump – cam ring position sensor	Wiring, injection pump cam ring position sensor, fuel temperature sensor, fuel injection pump, ECM
702	Fuel injection pump – cam ring calibration	Wiring, fuel injection pump, ECM
703	Fuel injection pump – timing control	Fuel injection pump timing, CKP sensor
750	Injector needle lift sensor – no signal	Wiring, injector needle lift sensor, fuel system, injector, ECM
751	Injector needle lift sensor – incorrect signal	Wiring, injector needle lift sensor, fuel system, injector, ECM
803	Exhaust gas recirculation (EGR) solenoid – incorrect signal	Wiring, relay module, EGR solenoid, ECM



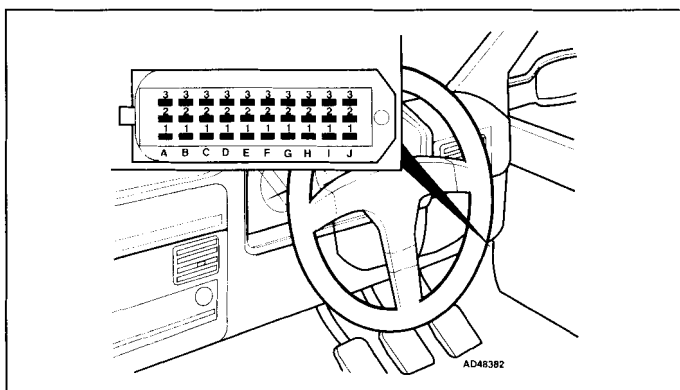


# PEUGEOT

Model: 806 1,9D Turbo  
 Year: 1995-00  
 Engine code: DHX  
 System: Bosch AS3

## Engine management

### Data link connector (DLC) locations



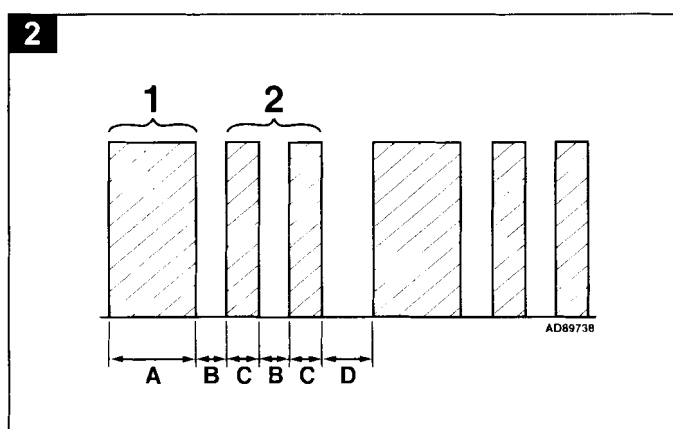
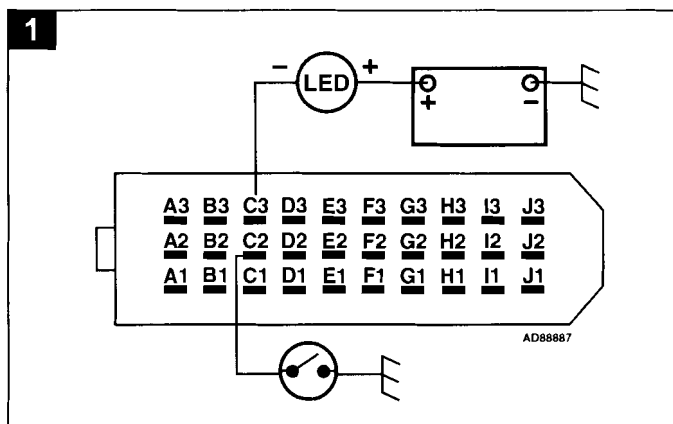
### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL) or LED.
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Vehicles fitted with a coded keypad: When switching on ignition or entering start code ensure diagnostic equipment is disconnected from the data link connector (DLC).

#### Accessing

- Switch ignition ON.
- Check that MIL illuminates.
- Connect LED test lamp between data link connector (DLC) terminal C3 and battery positive **1**.
- Bridge data link connector (DLC) terminal C2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Each trouble code consists of two groups of one or more flashes **2**.
- Long flashes indicate the 'tens' of the trouble code **2** [A].
- Short flashes indicate the 'units' of the trouble code **2** [C].
- A short pause separates each flash **2** [B].
- A long pause separates each trouble code **2** [D].
- For example: Trouble code 12 displayed **2**.
- Repeat operation. Note trouble codes.
- Compare with trouble code table. Rectify faults as necessary.





## Erasing

## Method 1

- Switch ignition ON.
- Connect LED test lamp between data link connector (DLC) terminal C3 and battery positive **1**.
- Bridge data link connector (DLC) terminal C2 and earth with a switched lead – contacts normally open **1**.
- Operate switch for 2,5-5 seconds.
- LED or MIL will now flash trouble code 12.
- Repeat switch operation until code 11 is displayed.
- Operate switch for 10-20 seconds.
- Switch ignition OFF.

## Method 2

- Ensure ignition switched OFF.
- Disconnect battery earth lead for 10 seconds.

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

## Trouble code identification

Flash type	Fault location	Probable cause
11	End of sequence	–
12	Start of sequence	–
14	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor, ECM
16	Exhaust gas recirculation (EGR) solenoid	Wiring, relay module, EGR solenoid
21	Fuel lever position sensor	Wiring, fuel lever position sensor
39	Malfunction indicator lamp (MIL)	Wiring, MIL, ECM
41	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Wiring, CKP/RPM sensor, air gap, ECM
46	Fuel injection pump – timing control	Fuel injection pump timing
49	Fuel injection timing solenoid	Wiring, fuel injection timing solenoid
53	Battery voltage	Wiring, battery discharged, alternator
54	Engine control module (ECM)	Wiring, battery, ECM
57	Barometric pressure (BARO) sensor	ECM
58	Glow plug control module – pre-heat	Wiring, glow plug(s), glow plug control module
65	Injector needle lift sensor	Wiring, fuel system, injector, injector needle lift sensor
66	Glow plug control module – pre-/post-heat	Wiring, glow plug control module
67	Glow plug warning lamp	Wiring, glow plug warning lamp, ECM
68	Idle speed control (ISC) actuator	Wiring, hoses blocked/leaking, ISC actuator





# RENAULT

**Model:** R5/Van • Extra/Rapid/Express • Clio/Kangoo • R19/21 • Mégane/Scénic/RX4 • Laguna • Safrane  
Alpine • Espace • Trafic T/V 2,2

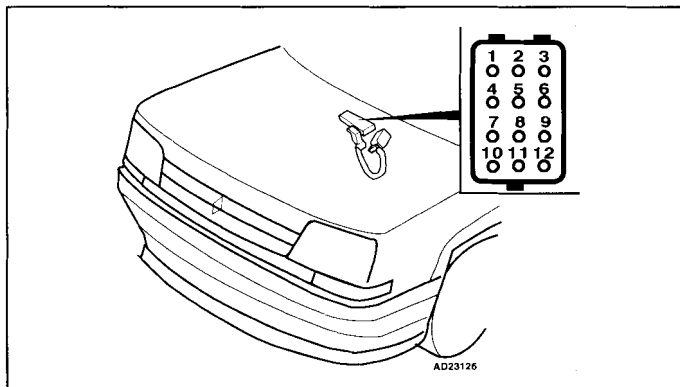
**Year:** 1986-04

**Engine code:** C3G 700/710/712, C3J 700/760/762, C3J 710, E7F 700/704/706/711/730/750, E7J 601, E7J 624/626, E7J 700/706, E7J 710/711/716/718/719, E7J 720/724/726/728, E7J 740/742/745, E7J 754/756/757/764, E7J 770/771/773/780, F3N 716/717/724/726, F3N 740/741/743/746, F3P 682, F3P 700/704/705/706/707/708, F3P 710/714/712/755/758/R7/Q7, F3P 720/724/B670/S724, F3P 760/765/782, F3R 710, F3R 722/723/J728/K729/611, F3R 750/751, F3R J/K/728/729, F4R, F4R 700/701/710/711/730, F4R 740/741/744, F5R 740, F7P 700/704/720/722, F7R 700, F7R D710, J7R 723/732/733/734/735, J7R 740/746/747/756/768, J7T 600/780, J7T 760/761/762/4766/Z766, J7T 772, K4J, K4J 712/713/750, K4M, K4M 700/748/750/752/753, K7M, K7M 702/703/720/744/745, L7X, L7X 700/701, N7Q 704/710/711, N7Q A700, N7U 700/701, X7X 744, Z7W 712/713, Z7X 722/723/726/753/755, Z7X 760/765/767, Z7X 775

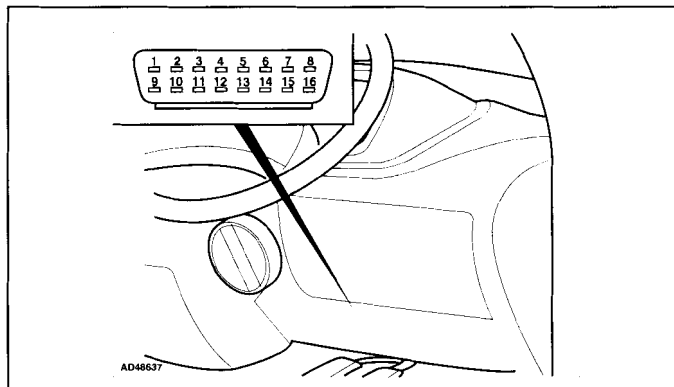
**System:** Bendix/Renix/Fenix MPI • Bosch/Siemens/Delco/Fenix/Renix Monopoint • Bosch Motronic M4.4  
Bosch Motronic MP7.0 • Magneti Marelli TBI • Sagem MPI/Safir • Siemens MPI/Fenix 3/3B/5  
Siemens Sirius/Sirius 32

## Engine management

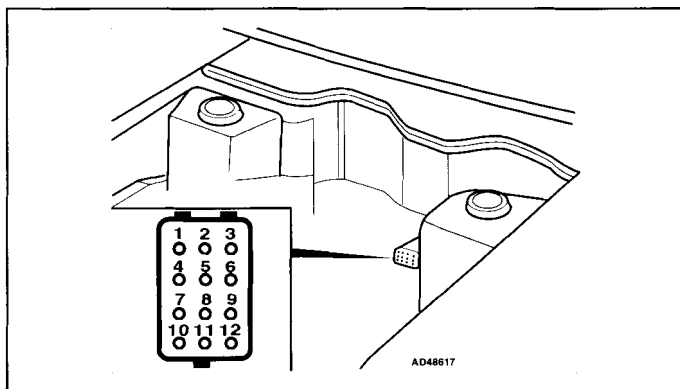
### Data link connector (DLC) locations



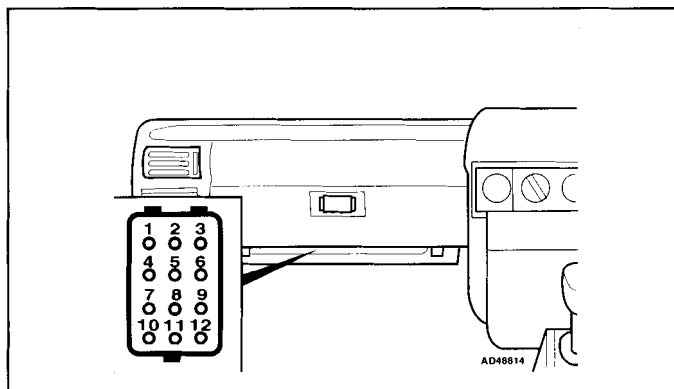
R5/Van



Kangoo



Extra/Rapid/Express



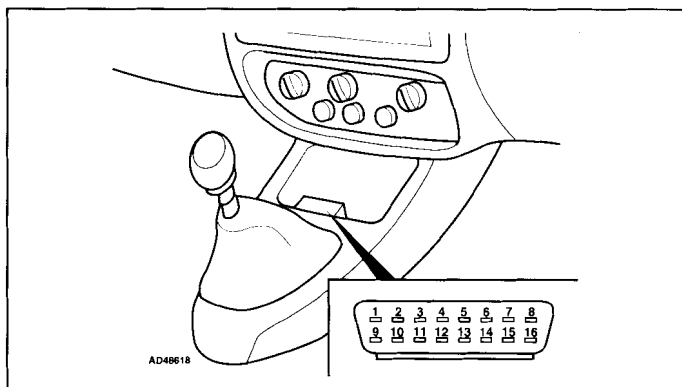
Clio →1997

Model: R5/Van • Extra/Rapid/Express • Clio/Kangoo • R19/21  
Mégane/Scénic/RX4 • Laguna • Safrane • Alpine • Espace  
Traffic T/V 2,2

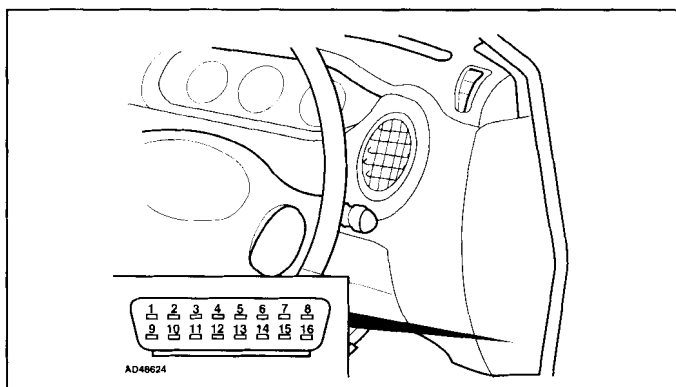
**RENAULT**



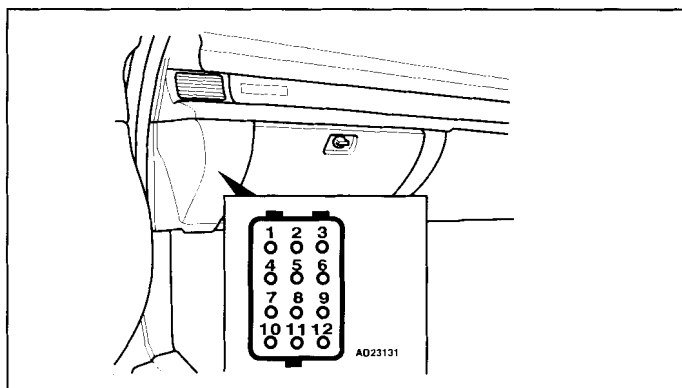
Engine management



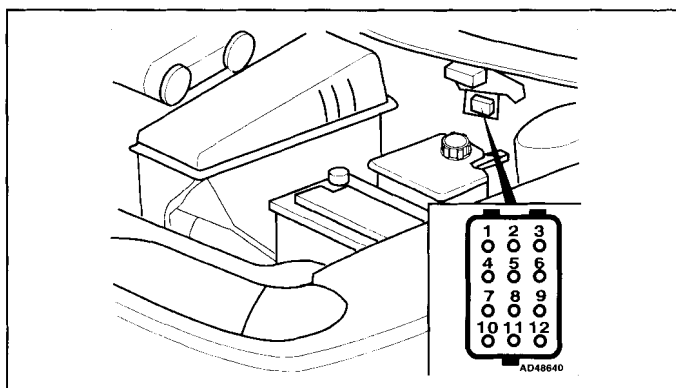
Clio 1998 →



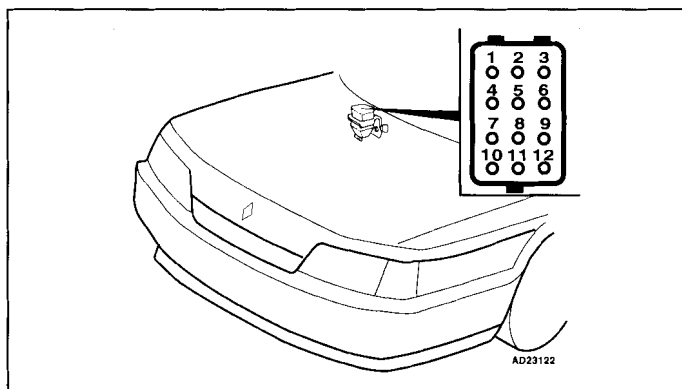
Mégane/Mégane Scénic/Scénic



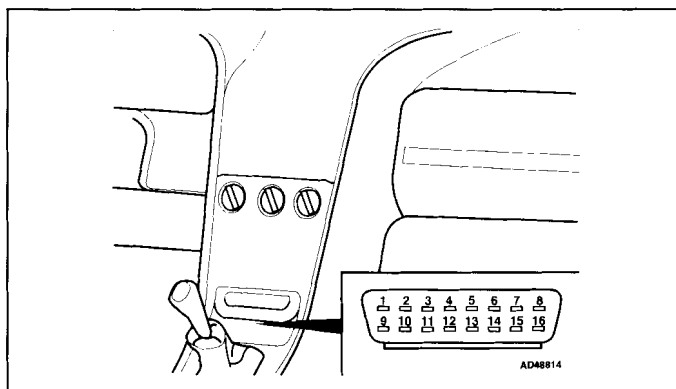
R19



Laguna →1996



R21



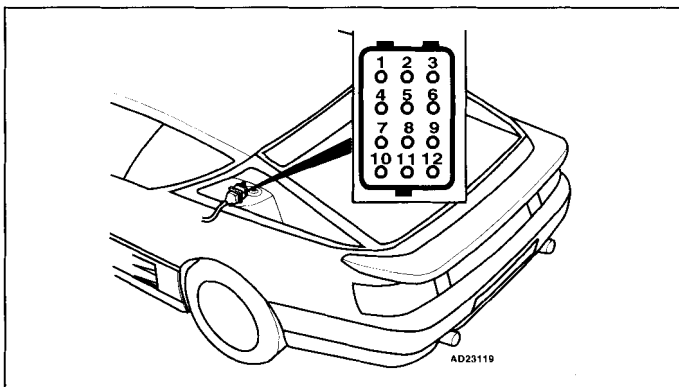
Laguna 1997 →



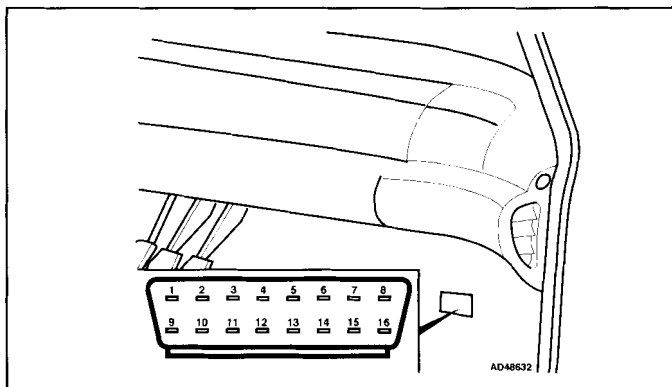
# RENAULT

Model: R5/Van • Extra/Rapid/Express • Clio/Kangoo • R19/21  
Mégane/Scénic/RX4 • Laguna • Safrane • Alpine • Espace  
Trafic T/V 2,2

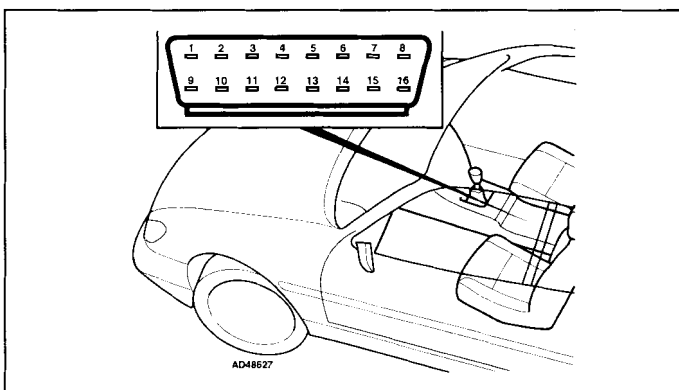
## Engine management



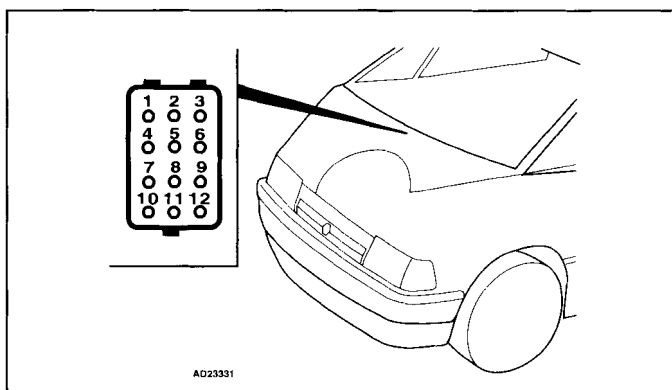
Alpine



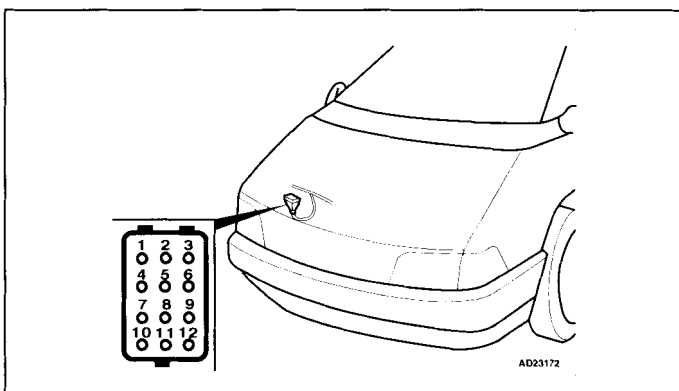
Espace 1996 →



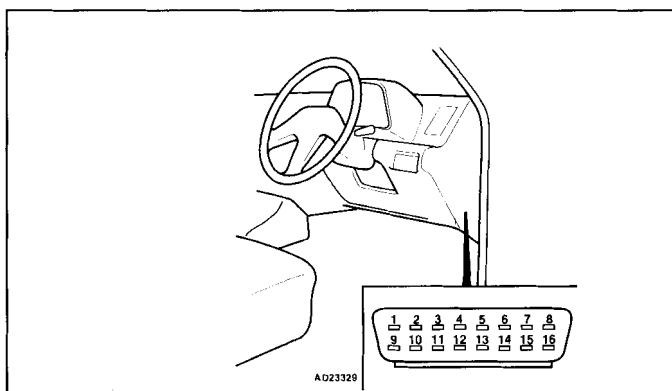
Safrane



Trafic – 12-pin



Espace →1995



Trafic – 16-pin

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.



Model: R5/Van • Extra/Rapid/Express • Clio/Kangoo • R19/21  
Mégane/Scénic/RX4 • Laguna • Safrane • Alpine • Espace  
Traffic T/V 2,2

**RENAULT**



Engine management

## Trouble code identification

Fault location	Probable cause
AC signal	Wiring, AC system, AC control module
AC system – malfunction	Wiring, supply voltage, MAP sensor
Crankshaft position (CKP) sensor – wiring transposed	Wiring
Crankshaft position (CKP) sensor	Wiring, CKP sensor, mechanical fault
Engine control module (ECM) – memory fault	Cancel ECM memory 5 times, ECM
Engine control module (ECM)	ECM
Engine coolant temperature (ECT) sensor	Wiring open circuit/short to positive/short to earth, ECT sensor
Evaporative emission (EVAP) canister purge valve	Wiring short to earth/open circuit/short to positive, supply voltage, EVAP canister purge valve
Exhaust gas recirculation (EGR) solenoid	Wiring short to earth/open circuit/short to positive, supply voltage, EGR solenoid, EGR valve position sensor wiring
Fuel pump relay – control circuit	Wiring short to earth/open circuit/short to positive, supply voltage, fuel pump relay
Heated oxygen sensor (HO2S)	Wiring, HO2S, air leak
Idle air control (IAC) valve	Wiring, IAC valve
Idle speed control (ISC) actuator	Wiring, ISC actuator, mechanical fault
Ignition coils	Wiring, supply voltage, ignition coil
Ignition key	Ignition key, supply voltage
Immobilizer circuit	Wiring, immobilizer defective
Injector – circuit	Wiring short to earth/open circuit/short to positive, injector
Injector – control circuit	Wiring short to earth/open circuit/short to positive, injector
Injector – malfunction	Wiring, supply voltage, injector
Intake air temperature (IAT) sensor	Wiring open circuit/short to positive, IAT sensor
Knock sensor (KS)	Wiring short to earth/open circuit, KS, KS incorrectly tightened
Malfunction indicator lamp (MIL)	Wiring short to earth/open circuit/short to positive, supply voltage, MIL lamp
Manifold absolute pressure (MAP) sensor	TP sensor signal, wiring, MAP sensor
Mixture adjustment resistor	Wiring open circuit/short to earth/short to positive, mixture adjustment resistor
Supply voltage	Wiring, fuses
Throttle position (TP) sensor	Wiring short to earth/open circuit/short to positive, TP sensor
Turbocharger (TC) wastegate regulating valve	Wiring short to earth/open circuit/short to positive, supply voltage, earth connection, TC wastegate regulating valve
Vehicle speed sensor (VSS)	Wiring, VSS, mechanical fault
Vehicle speed signal	Wiring, ABS system defective
AT signal	Wiring, AT system defective



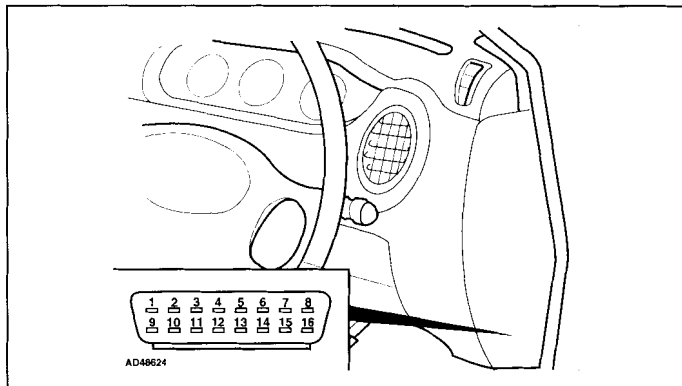


# RENAULT

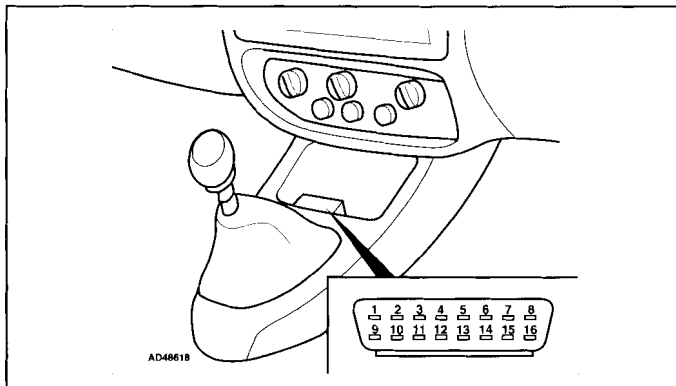
Model: Clio 1,2 • Mégane 2,0 • Kangoo 1,2  
 Year: 1995-04  
 Engine code: D7F 710, D7F 720, D7F A730, F5R 740  
 System: Siemens Sirius 3H • Sagem Safir/2

## Engine management

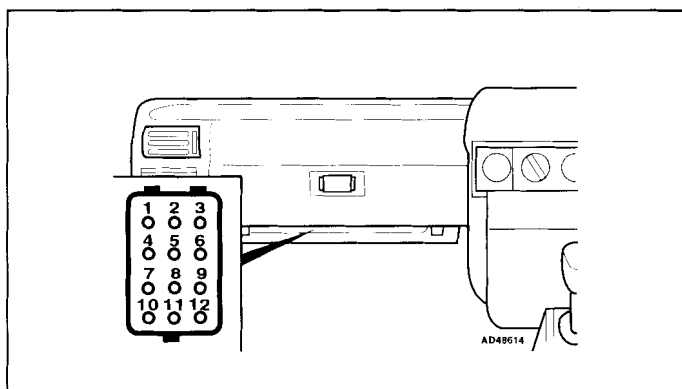
### Data link connector (DLC) locations



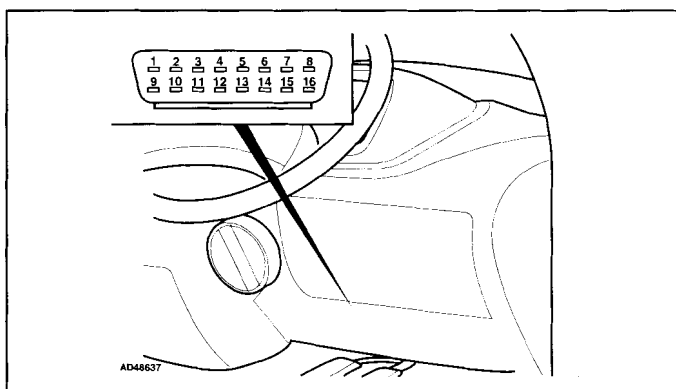
Mégane



Clio - 1998 →



Clio - →1997



Kangoo

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

**Trouble code identification**

<b>Fault location</b>	<b>Probable cause</b>
AC signal – D7F	Wiring, AC system, AC control module
AC signal – F5R 740	Wiring, AC system, AC control module
AC system – malfunction – F5R 740	Wiring, supply voltage, MAP sensor
Camshaft position (CMP) sensor – F5R 740	Wiring, earth connection, supply voltage, CMP sensor
CAN data bus – F5R 740	Wiring open circuit/earth connection, supply voltage
Crankshaft position (CKP) sensor – D7F – signal	Wiring short to earth/open circuit/transposed, CKP sensor, flywheel
Crankshaft position (CKP) sensor – F5R 740 – signal	Wiring, CKP sensor, flywheel
Engine control module (ECM)	Cancel ECM memory 5 times, ECM
Engine control relay – control circuit – F5R 740	Wiring short to earth/open circuit/short to positive, supply voltage, earth connection, engine control relay
Engine coolant blower motor relay – D7F	Wiring short to earth/open circuit/short to positive, supply voltage, relay
Engine coolant 'hot' warning lamp – F5R 740	Wiring short circuit/open circuit/short to positive, warning lamp/supply voltage
Engine coolant temperature (ECT) sensor	Wiring short to earth/open circuit/short to positive, ECT sensor
Evaporative emission (EVAP) canister purge valve	Wiring short to earth/open circuit/short to positive, supply voltage, EVAP canister purge valve
Exhaust gas recirculation (EGR) solenoid – F5R 740	Wiring short to earth/open circuit/short to positive, supply voltage, EGR solenoid, EGR valve position sensor wiring
Exhaust gas recirculation (EGR) valve position sensor – F5R 740	Wiring, EGR valve
Fuel pressure regulator control solenoid – F5R 740	Wiring short to earth/open circuit/short to positive, supply voltage, earth connection, fuel pressure/pump, fuel pressure regulator control solenoid
Fuel pump relay – control circuit	Wiring short to earth/open circuit/short to positive, supply voltage, fuel pump relay
Heated oxygen sensor (HO2S) – D7F	Wiring, heater supply voltage, intake leak, HO2S
Heated oxygen sensor (HO2S) – heater circuit – D7F	Wiring short to earth/open circuit/short to positive, supply voltage, HO2S, relay
Heated oxygen sensor (HO2S), downstream – F5R 740	Wiring, heater supply voltage, intake leak, HO2S
Heated oxygen sensor (HO2S), downstream – heater circuit – F5R 740	Wiring short to earth/open circuit/short to positive, supply voltage, HO2S
Heated oxygen sensor (HO2S), upstream – F5R 740	Wiring, heater supply voltage, intake leak, HO2S
Heated oxygen sensor (HO2S), upstream – heater circuit – F5R 740	Wiring short to earth/open circuit/short to positive, supply voltage, HO2S
Idle air control (IAC) valve – D7F A730	Wiring, IAC valve
Idle air control (IAC) valve, AC – D7F 720/710	Wiring, IAC valve
Ignition coil – cylinders 1 & 4 – F5R 740	Wiring, supply voltage, ignition coil
Ignition coil – cylinders 2 & 3 – F5R 740	Wiring, supply voltage, ignition coil
Ignition coil – D7F	Wiring short to earth/open circuit, supply voltage, ignition coil
Immobilizer – circuit	Wiring, immobilizer defective



**RENAULT**

Model: Clio 1,2 • Mégane 2,0 • Kangoo 1,2

**Engine management**

<b>Fault location</b>	<b>Probable cause</b>
Immobilizer – programming – F5R 740	Incorrect programming
Injector 1 – circuit – F5R 740	Wiring open circuit/short to positive, injector control module – supply voltage/earth connection, injector
Injector 1 – control circuit – F5R 740	Wiring short to earth/open circuit/short to positive, injector control module – supply voltage/earth connection
Injector 2 – circuit – F5R 740	Wiring open circuit/short to positive, injector control module – supply voltage/earth connection, injector
Injector 2 – control circuit – F5R 740	Wiring short to earth/open circuit/short to positive, injector control module – supply voltage/earth connection
Injector 3 – circuit – F5R 740	Wiring open circuit/short to positive, injector control module – supply voltage/earth connection, injector
Injector 3 – control circuit – F5R 740	Wiring short to earth/open circuit/short to positive, injector control module – supply voltage/earth connection
Injector 4 – circuit – F5R 740	Wiring open circuit/short to positive, injector control module – supply voltage/earth connection, injector
Injector 4 – control circuit – F5R 740	Wiring short to earth/open circuit/short to positive, injector control module – supply voltage/earth connection
Injector control module – F5R 740	Wiring open circuit/supply voltage, earth connection, injector control module
Injectors – D7F	Wiring open circuit/short circuit/short to positive, supply voltage, injector
Intake air temperature (IAT) sensor	Wiring short to earth/open circuit/short to positive, IAT sensor
Knock sensor (KS)	Wiring short to earth/open circuit, KS, KS incorrectly tightened
Malfunction indicator lamp (MIL) – F5R 740/D7F 710	Wiring short to earth/open circuit/short to positive, supply voltage, MIL lamp
Manifold absolute pressure (MAP) sensor	TP sensor signal, wiring, MAP sensor
Supply voltage – D7F	Wiring open circuit/earth wire, engine control relay, fuel pump relay
Supply voltage – F5R 740	Wiring open circuit/earth wire, engine control relay, injector control module – voltage supply/earth wire
Throttle position (TP) sensor – D7F 710/720	Wiring short to earth/open circuit/short to positive, supply voltage, TP sensor
Throttle position (TP) sensor – F5R 740/D7F A730	Wiring short to earth/open circuit/short to positive, supply voltage, TP sensor, mechanical fault
Vehicle speed sensor (VSS) – D7F	Wiring, supply voltage, earth connection, VSS, mechanical fault
Vehicle speed signal – F5R 740	Wiring, ABS system defective



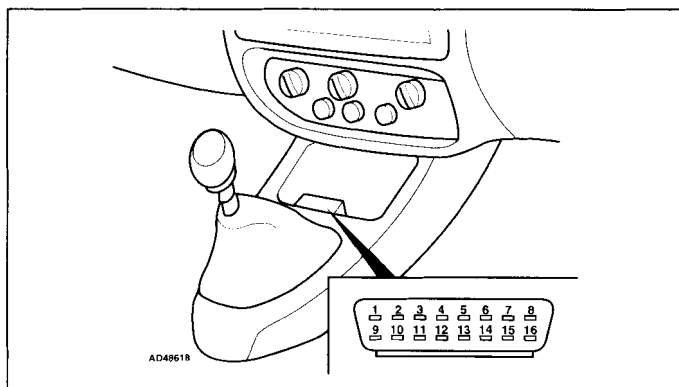
Model: Clio 1,5D Turbo • Kangoo 1,5D Turbo  
 Year: 2000-04  
 Engine code: K9K 700/702/704/710  
 System: Lucas common rail

**RENAULT**

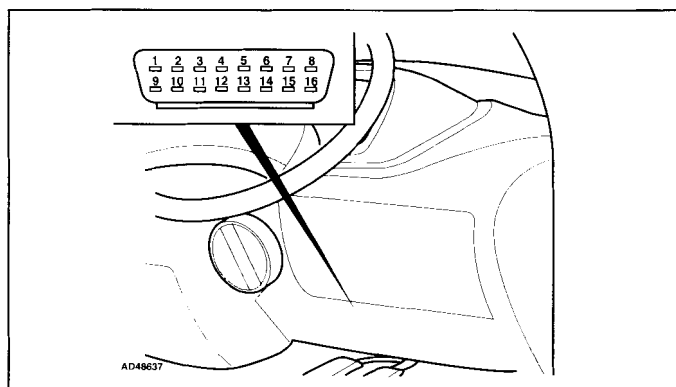


Engine management

## Data link connector (DLC) locations



Clio



Kangoo

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

### Trouble code identification

Fault location	Probable cause
AC control module	Wiring short to earth/open circuit/short to positive, AC system, AC control module
AC control module – control circuit	Wiring short to earth/open circuit/short to positive
Accelerator pedal position (APP) sensor	Wiring short to earth/open circuit/short to positive, supply voltage, APP sensor
Accelerator pedal position (APP) sensor – track 1	Wiring short to earth/open circuit/short to positive, supply voltage, APP sensor
Accelerator pedal position (APP) sensor – track 2	Wiring short to earth/open circuit/short to positive, supply voltage, APP sensor
Barometric pressure (BARO) sensor	ECM
Battery voltage – high/low	Wiring open circuit/earth wire, battery, alternator
Brake pedal position (BPP) switch	Wiring short to earth/open circuit/supply voltage, BPP switch
Camshaft position (CMP) sensor	Wiring open circuit, earth connection, CMP sensor, valve timing

**RENAULT**

Model: Clio 1,5D Turbo • Kangoo 1,5D Turbo

**Engine management**

<b>Fault location</b>	<b>Probable cause</b>
Combustion – cylinder 1	Low compression, valve clearances, injector, EGR system, ECM
Combustion – cylinder 2	Low compression, valve clearances, injector, EGR system, ECM
Combustion – cylinder 3	Low compression, valve clearances, injector, EGR system, ECM
Combustion – cylinder 4	Low compression, valve clearances, injector, EGR system, ECM
Crankshaft position (CKP) sensor – signal	Wiring, CKP sensor
Engine control module (ECM)	Injector wiring short to earth/open circuit, ECM
Engine control module (ECM) – RAM error	Erase memory – switch ignition ON/OFF and recheck, ECM
Engine coolant blower motor relay – high speed	Wiring short to earth/open circuit/short to positive, supply voltage, relay
Engine coolant blower motor relay – low speed	Wiring short to earth/open circuit/short to positive, supply voltage, relay
Engine coolant heater relay 1 – heater 1	Wiring short to earth/open circuit/short to positive, relay
Engine coolant heater relay 2 – heater 2	Wiring short to earth/open circuit/short to positive, relay
Engine coolant heater relay 2 – heater 3	Wiring short to earth/open circuit/short to positive, relay
Engine coolant 'hot' warning lamp	Wiring short to earth/open circuit/short to positive, supply voltage, warning lamp, ECM
Engine coolant pressure sensor	Wiring short to earth/open circuit, pressure sensor
Engine coolant temperature (ECT) sensor	Wiring short to earth/open circuit, ECT sensor
Exhaust gas recirculation (EGR) solenoid	Wiring short to earth/open circuit/short to positive
Exhaust gas recirculation (EGR) valve position sensor	Wiring short to earth/open circuit/short to positive, supply voltage, mechanical fault, EGR solenoid
Fuel pressure regulator control solenoid – pressure high/low	Wiring short to earth/open circuit, fuel level low, air in fuel system, fuel pressure sensor, high pressure pump
Fuel pressure sensor	Wiring short to earth/open circuit/short to positive, supply voltage, fuel pressure sensor
Fuel shut-off solenoid	Wiring short to earth/open circuit/short to positive, shut-off solenoid
Fuel temperature sensor	Wiring short to earth/open circuit/short to positive, fuel temperature sensor
Glow plug circuit	Wiring, supply voltage, glow plugs
Glow plug control module	Wiring short to earth/open circuit/short to positive, earth connection, glow plug control module
Immobilizer – circuit	Wiring, immobilizer defective
Injector 1	Wiring short to earth/open circuit/short to positive, supply voltage, injector
Injector 2	Wiring short to earth/open circuit/short to positive, supply voltage, injector
Injector 3	Wiring short to earth/open circuit/short to positive, supply voltage, injector
Injector 4	Wiring short to earth/open circuit/short to positive, supply voltage, injector
Injectors – circuit malfunction	Wiring short to earth/open circuit/short to positive, injector, ECM
Intake air temperature (IAT) sensor	Wiring short to earth/open circuit/short to positive, IAT sensor
Knock sensor (KS)	Wiring short to earth/open circuit/short to positive, KS, ECM
Manifold absolute pressure (MAP) sensor	Wiring short to earth/open circuit, MAP sensor
Power assisted steering relay – control circuit	Wiring short to earth/open circuit/short to positive, relay

Model: Clio 1,5D Turbo • Kangoo 1,5D Turbo

**RENAULT**



Engine management

Fault location	Probable cause
Sensor supply voltage – APP (track 1)/fuel pressure/ EGR valve position/MAP/CMP/coolant pressure sensor	Wiring short to earth/short to positive
Tachometer – signal	Wiring short to earth/open circuit/short to positive, tachometer
Vehicle speed signal	Wiring short to earth/open circuit/short to positive, ABS system



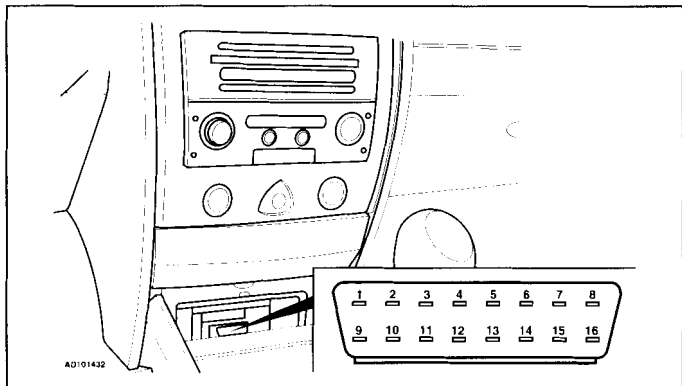


# RENAULT

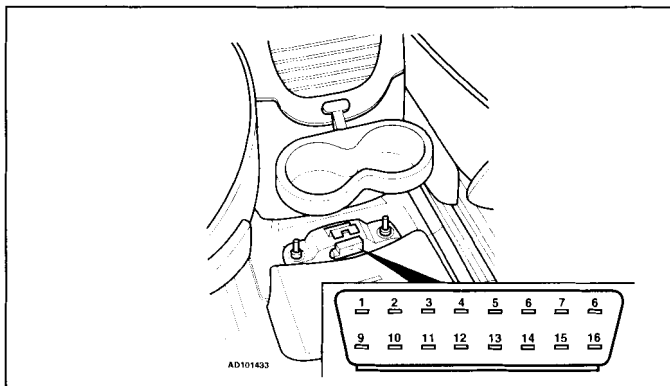
Model: Mégane 1,4/1,6/2,0 • Scénic 1,4/1,6/2,0  
Year: 2002-04  
Engine code: K4J 730/732, K4M 760/761/782, F4R 770/771  
System: Sagem 3000

## Engine management

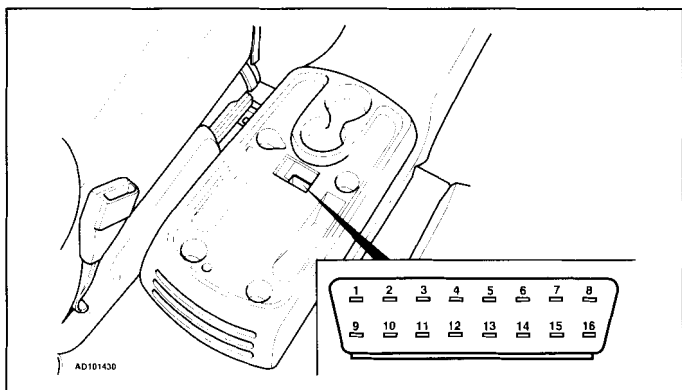
### Data link connector (DLC) locations



Mégane – centre console



Scénic – with sliding centre console, under trim panel



Scénic – without sliding centre console, under carpet

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble codes	–
P1604	Passenger compartment electric heating element	CAN data bus



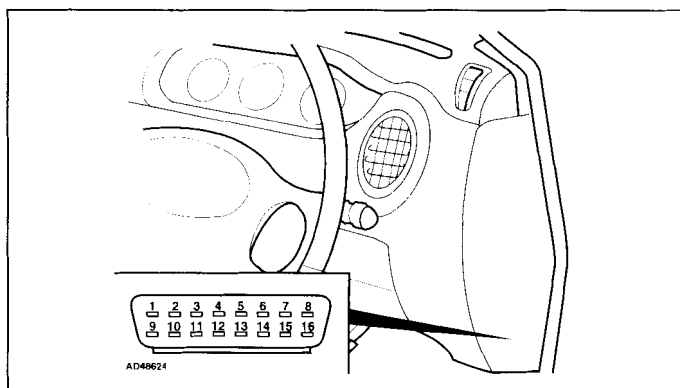


Model: **Mégane 1,9D**  
 Year: **1999-02**  
 Engine code: **F8Q 622**  
 System: **Lucas EPIC**

**RENAULT**

Engine management

## Data link connector (DLC) locations



## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

### Trouble code identification

Fault location	Probable cause
AC signal	Wiring, AC system, AC control module
Accelerator pedal position (APP) sensor	Wiring short to earth/open circuit/short to positive, APP sensor
Barometric pressure (BARO) sensor	ECM
Battery voltage – high/low	Wiring open circuit/earth wire, battery, alternator
Crankshaft position (CKP) sensor – signal	Wiring, CKP sensor, flywheel
Engine control module (ECM)	ECM
Engine control relay	Wiring short to earth/open circuit/short to positive, supply voltage, earth connection, engine control relay, ECM
Engine coolant blower motor relay – high speed	Wiring short to earth/open circuit/short to positive, supply voltage, relay
Engine coolant blower motor relay – low speed	Wiring short to earth/open circuit/short to positive, supply voltage, relay

**RENAULT**Model: **Mégane 1,9D****Engine management**

<b>Fault location</b>	<b>Probable cause</b>
Engine coolant temperature (ECT) sensor	Wiring short to earth/open circuit/short to positive, ECT sensor
Exhaust gas recirculation (EGR) solenoid	Wiring short to earth/open circuit/short to positive, supply voltage, EGR solenoid, EGR valve position sensor/wiring
Fuel injection timing solenoid	Wiring short to earth/open circuit/short to positive, supply voltage, timing solenoid
Fuel quantity adjuster 1 & 2	Wiring short to earth/open circuit/short to positive, supply voltage, earth connection, quantity adjuster
Fuel shut-off solenoid	Wiring short to earth/open circuit/short to positive, supply voltage, solenoid, ECM
Fuel temperature sensor	Wiring short to earth/open circuit/short to positive, fuel temperature sensor
Glow plug circuit	Wiring, supply voltage, glow plugs, glow plug control module
Glow plug control module	Wiring short to earth/open circuit/short to positive, supply voltage
Glow plug warning lamp – circuit	Wiring, warning lamp, supply voltage
Immobilizer – circuit	Wiring, immobilizer defective
Injection pump assembly memory circuit	Wiring, injection pump
Injection pump rotor position sensor	Wiring, rotor position sensor, ECM
Intake air temperature (IAT) sensor	Wiring short to earth/open circuit/short to positive, IAT sensor
On board diagnostic (OBD)	Rectify other faults recorded
Power assisted steering control relay	Wiring short to earth/open circuit/short to positive, supply voltage, relay
Protective circuit	ECM
Sensor supply voltage high/low	Wiring, accelerator pedal position (APP) sensor, exhaust gas recirculation (EGR) valve position sensor, injection pump assembly
Vehicle speed signal	Wiring, supply voltage, earth connection, VSS, ABS system, mechanical fault



Model: Mégane 1,9D Turbo • Mégane Scénic 1,9D Turbo  
Mégane 1,9D Turbo • Scénic 1,9D Turbo  
Espace 2,2D Turbo

Year: 1997-03

Engine code: F9Q 730/734, F9Q 730/734, F9Q 731/736, F9Q,  
G8T 714/716

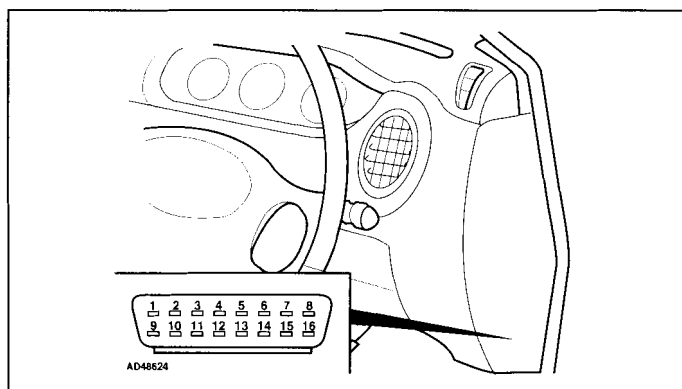
System: Bosch MSA 15.5 • Bosch AS3.3

**RENAULT**

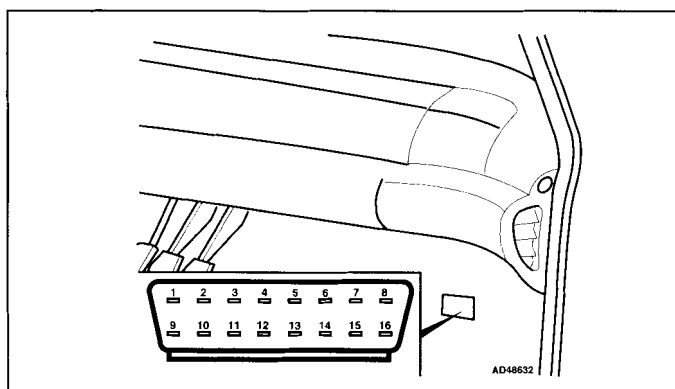


Engine management

## Data link connector (DLC) locations



Mégane/Scénic



Espace

## Trouble codes

### General information

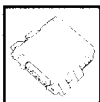
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

### Trouble code identification

Fault location	Probable cause
Accelerator pedal position (APP) sensor – F9Q	Wiring short to earth/open circuit/short to positive, supply voltage, APP sensor
Barometric pressure (BARO) sensor – F9Q	ECM
Brake pedal position (BPP) switch – F9Q	Wiring short to earth/open circuit, BPP switch
Clutch pedal position (CPP) switch – F9Q	Wiring short to earth/open circuit, CPP switch
Cold start injection advance solenoid – G8T 716	Wiring short to earth/open circuit/short to positive, solenoid
Crankshaft position (CKP) sensor – signal	Wiring, CKP sensor, flywheel, 4 slots at 90° – G8T 714/F9Q, 2 slots at 180° – G8T 716
Engine control module (ECM)	ECM
Engine control relay – F9Q	Wiring open circuit, engine control relay

**RENAULT**Model: Mégane 1,9D Turbo • Mégane Scénic 1,9D Turbo  
Mégane 1,9D Turbo • Scénic 1,9D Turbo • Espace 2,2D Turbo**Engine management**

<b>Fault location</b>	<b>Probable cause</b>
Engine coolant temperature (ECT) sensor	Wiring short to earth/open circuit/short to positive, ECT sensor
Exhaust gas recirculation (EGR) solenoid	Wiring short to earth/open circuit/short to positive, EGR solenoid, ECM
Fuel injection timing solenoid	Wiring short to earth/open circuit/short to positive, supply voltage, timing solenoid
Fuel lever position sensor – G8T	Wiring short to earth/open circuit/short to positive, supply voltage, position sensor
Fuel quantity adjuster/position sensor – F9Q	Wiring short to earth/open circuit/short to positive, supply voltage, injection pump, ECM
Fuel shut-off solenoid – F9Q	Wiring short to earth/open circuit/short to positive, supply voltage, earth connection, shut-off solenoid
Full load/no load – incorrectly coded – G8T	ECM incorrectly coded
Fuel temperature sensor – F9Q	Wiring short to earth/open circuit/short to positive, fuel temperature sensor
Glow plugs – G8T	Wiring short to earth, glow plugs
Glow plug control module	Wiring short to earth/open circuit/short to positive, earth connection, glow plugs, glow plug control module, ECM
Glow plug warning lamp	Wiring short to earth/open circuit/short to positive, supply voltage, warning lamp
Idle speed control (ISC) actuator – G8T	Wiring short to earth/open circuit/short to positive, ISC actuator
Immobilizer – signal – F9Q	Wiring, incorrectly coded, immobilizer defective
Injector needle lift sensor – F9Q/G8T 714	Wiring short to earth/open circuit/short to positive, injector
Intake air temperature (IAT) sensor	Wiring short to earth/open circuit/short to positive, IAT sensor
Mass air flow (MAF) sensor – F9Q	Wiring short to earth/open circuit/short to positive, supply voltage, intake system, MAF sensor
Supply voltage – high/low	Wiring, earth wire, alternator, battery
Vehicle speed sensor (VSS) – F9Q	Wiring short to earth/open circuit/short to positive, supply voltage, earth connection, VSS, mechanical fault



Model: **Mégane 1,9D Turbo • Scénic/RX4 1,9D Turbo  
Laguna 1,9D Turbo • Espace 2,2D Turbo  
Master 2,2D Turbo**

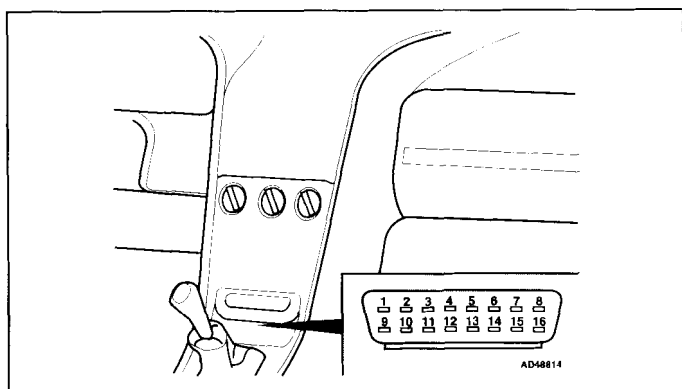
Year: **1999-03**

Engine code: **F9Q 718, F9Q 732, F9Q 740, G9T 710, G9T 720,  
G9T 722**

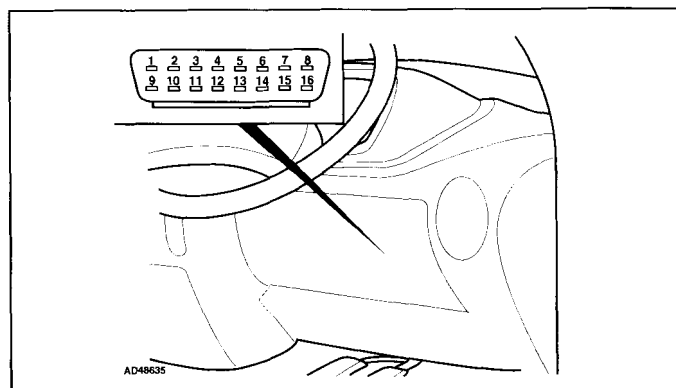
System: **Bosch common rail**

Engine management

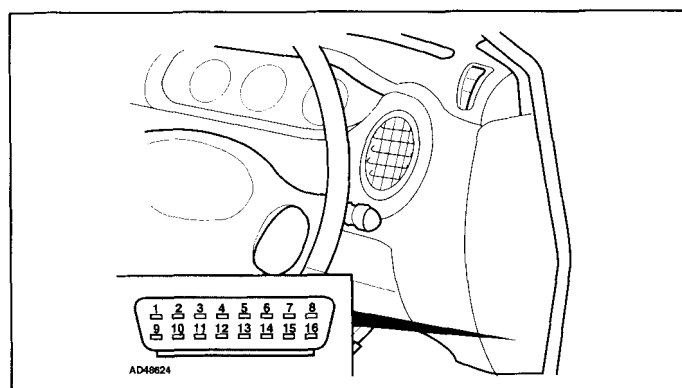
## Data link connector (DLC) locations



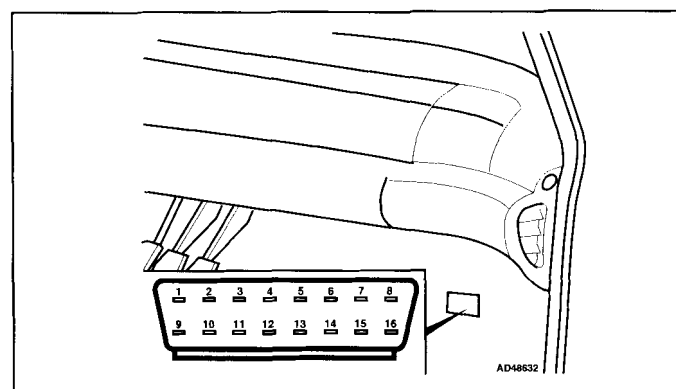
Laguna



Master



Mégane/Scénic



Espace

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

**RENAULT**
 Model:    Mégane 1,9D Turbo • Scénic/RX4 1,9D Turbo  
              Laguna 1,9D Turbo • Espace 2,2D Turbo • Master 2,2D Turbo
**Engine management****Trouble code identification**

<b>Fault location</b>	<b>Probable cause</b>
Accelerator pedal position (APP) sensor – track 1	Wiring short to earth/open circuit/short to positive, supply voltage, APP sensor
Accelerator pedal position (APP) sensor – track 2	Wiring short to earth/open circuit/short to positive, supply voltage, APP sensor
Barometric pressure (BARO) sensor	ECM
Battery voltage – high/low	Wiring open circuit/earth wire, battery, alternator
Brake pedal position (BPP) switch	Wiring short to earth/open circuit, BPP switch
Camshaft position (CMP) sensor	Wiring open circuit, earth connection, CMP sensor, CKP sensor
Clutch pedal position (CPP) switch	Wiring short to earth/open circuit, earth connection, CPP switch
Crankshaft position (CKP) sensor – signal	Wiring, CKP sensor
Cruise control	Wiring short to earth/open circuit/short to positive, supply voltage, earth connection, cruise control master/selector switch
Engine control module (ECM)	ECM
Engine control module (ECM) – ignition key OFF signal	Erase memory – switch ignition ON/OFF and recheck, ECM
Engine control module (ECM) – ignition key ON signal	Erase memory – switch ignition ON/OFF and recheck, ECM
Engine control module (ECM) – injector control	Erase memory – switch ignition ON/OFF and recheck, ECM
Engine control module (ECM) – micro-controller	Erase memory – switch ignition ON/OFF and recheck, ECM
Engine control module (ECM) – signal converter	Erase memory – switch ignition ON/OFF and recheck, ECM
Engine control relay	Wiring open circuit, supply voltage, battery connections, relay
Engine coolant blower motor relay – low speed	Wiring short to earth/open circuit/short to positive, supply voltage, relay
Engine coolant heater relay 1	Wiring short to earth/open circuit/short to positive, relay
Engine coolant heater relay 2	Wiring short to earth/open circuit/short to positive, relay
Engine coolant heater relay 3	Wiring short to earth/open circuit/short to positive, relay
Engine coolant temperature (ECT) sensor	Wiring short to earth/open circuit/short to positive, ECT sensor
Exhaust gas recirculation (EGR) solenoid	Wiring short to earth/open circuit/short to positive, supply voltage, EGR solenoid, EGR valve position sensor/wiring
Exhaust gas recirculation (EGR) valve position sensor	Wiring short to earth/open circuit/short to positive, supply voltage, mechanical fault, EGR solenoid
Fuel pressure high/low	Wiring short to earth/open circuit/short to positive, supply voltage, fuel pressure control solenoid, fuel pressure sensor, injectors
Fuel pressure control solenoid	Wiring short to earth/open circuit/short to positive, supply voltage, solenoid
Fuel pressure sensor	Wiring short to earth/open circuit/short to positive, supply voltage, fuel pressure sensor



Fault location	Probable cause
Fuel pump relay	Wiring short to earth/open circuit/short to positive, fuel pump relay
Fuel temperature sensor	Wiring short to earth/open circuit/short to positive, fuel temperature sensor
Glow plug control module	Wiring short to earth/open circuit/short to positive, earth connection, glow plug control module, glow plugs
Immobilizer – circuit	Wiring, incorrectly coded, immobilizer defective
Injector 1	Wiring short to earth/open circuit/short to positive, supply voltage, injector, ECM
Injector 2	Wiring short to earth/open circuit/short to positive, supply voltage, injector, ECM
Injector 3	Wiring short to earth/open circuit/short to positive, supply voltage, injector, ECM
Injector 4	Wiring short to earth/open circuit/short to positive, supply voltage, injector, ECM
Intake air temperature (IAT) sensor	Wiring short to earth/open circuit/short to positive, IAT sensor
Intake manifold air control solenoid	Wiring short to earth/open circuit/short to positive, supply voltage, solenoid
Malfunction indicator lamp (MIL)	Wiring short to earth/open circuit/short to positive, supply voltage, MIL lamp
Manifold absolute pressure (MAP) sensor	Wiring short to earth/open circuit/short to positive, supply voltage, intake leak, MAP sensor
Mass air flow (MAF) sensor	Wiring short to earth/open circuit/short to positive, supply voltage, earth connection, MAF sensor
Sensor supply voltage 1 – APP/fuel pressure/MAF/EGR valve position/MAP sensor	Wiring short to earth/short to positive, ECM
Sensor supply voltage 2 – APP sensor	Wiring short to earth/short to positive, ECM
Turbocharger (TC) wastegate regulating valve	Wiring short to earth/open circuit/short to positive, supply voltage, intake leak, TC wastegate regulating valve
Vehicle speed signal	Wiring, supply voltage, earth connection, ABS system, mechanical fault

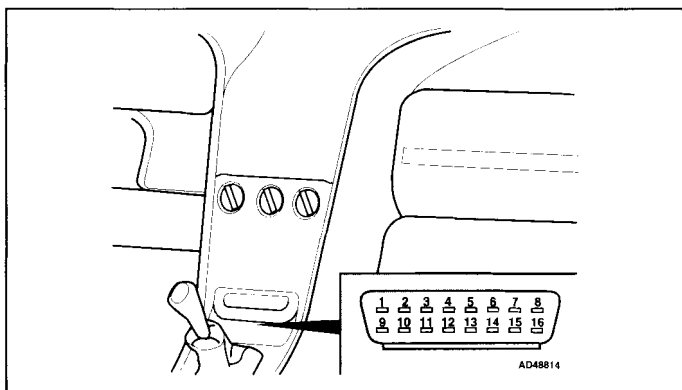
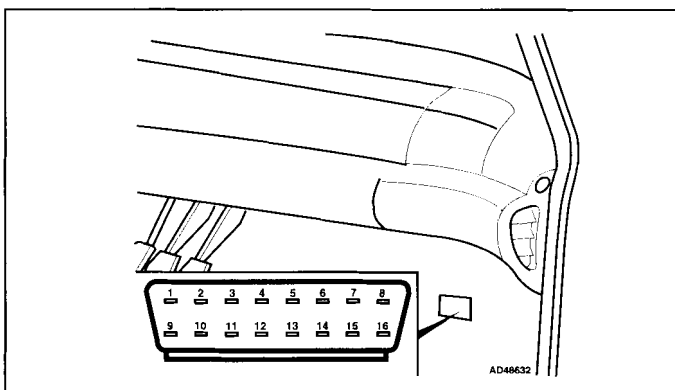


**RENAULT**

Model: Laguna 1,6/1,8/2,0 16V • Espace 2,0 16V  
Year: 1998-02  
Engine code: F4P 760, F4R 700, F4R 780, K4M 720/724  
System: Siemens Sirius 32

## Engine management

### Data link connector (DLC) locations

**Laguna****Espace**

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The engine control module (ECM) fault memory can only be accessed using diagnostic equipment able to display fault locations as a text description.

#### Trouble code identification

Fault location	Probable cause
ABS wheel speed sensor	Wiring short to earth/open circuit/short to positive, sensor
AC signal	Wiring, AC system, AC control module
AC system – malfunction	Wiring, supply voltage, MAP sensor
Automatic transmission (AT) – connection to ECM	Wiring
Camshaft position (CMP) actuator	Wiring, CMP actuator
Catalytic converter failure	Air leak, misfire, mechanical fault
Crankshaft position (CKP) sensor – signal	Wiring, CKP sensor, flywheel
Cylinder 1 – misfire detected	Ignition system, fuel supply, injectors
Cylinder 2 – misfire detected	Ignition system, fuel supply, injectors
Cylinder 3 – misfire detected	Ignition system, fuel supply, injectors
Cylinder 4 – misfire detected	Ignition system, fuel supply, injectors
Engine control module (ECM)	Cancel ECM memory 5 times, ECM
Engine control relay – control circuit	Wiring short to earth/open circuit/short to positive, supply voltage, earth connection, engine control relay



Fault location	Probable cause
Engine coolant blower motor – high speed	Wiring short to earth/open circuit/short to positive, relay
Engine coolant blower motor – low speed	Wiring short to earth/open circuit/short to positive, relay
Engine coolant 'hot' warning lamp	Wiring short circuit/open circuit/short to positive, warning lamp/supply voltage
Engine coolant temperature (ECT) sensor	Wiring short to earth/open circuit/short to positive, ECT sensor
Evaporative emission (EVAP) canister purge valve	Wiring short to earth/open circuit/short to positive, supply voltage, EVAP canister purge valve
Fuel circuit – operational failure	Fuel supply, injectors
Fuel pump relay – control circuit	Wiring short to earth/open circuit/short to positive, supply voltage, fuel pump relay
Heated oxygen sensor (HO2S), downstream	Wiring, heater supply voltage, intake leak, HO2S
Heated oxygen sensor (HO2S), downstream – heater circuit	Wiring short to earth/open circuit/short to positive, supply voltage, HO2S
Heated oxygen sensor (HO2S), upstream	Wiring, heater supply voltage, intake leak, HO2S
Heated oxygen sensor (HO2S), upstream – heater circuit	Wiring short to earth/open circuit/short to positive, supply voltage, HO2S
Idle air control (IAC) valve	Wiring, IAC valve
Ignition coil – cylinders 1 & 4	Wiring, supply voltage, ignition coil
Ignition coil – cylinders 2 & 3	Wiring, supply voltage, ignition coil
Immobilizer – circuit	Wiring, immobilizer defective
Immobilizer – programming	Incorrect programming
Injector 1 – circuit	Wiring open circuit/short to positive, injector control module – supply voltage/earth connection, injector
Injector 1 – control circuit	Wiring short to earth/open circuit/short to positive, injector control module – supply voltage/earth connection
Injector 2 – circuit	Wiring open circuit/short to positive, injector control module – supply voltage/earth connection, injector
Injector 2 – control circuit	Wiring short to earth/open circuit/short to positive, injector control module – supply voltage/earth connection
Injector 3 – circuit	Wiring open circuit/short to positive, injector control module – supply voltage/earth connection, injector
Injector 3 – control circuit	Wiring short to earth/open circuit/short to positive, injector control module – supply voltage/earth connection
Injector 4 – circuit	Wiring open circuit/short to positive, injector control module – supply voltage/earth connection, injector
Injector 4 – control circuit	Wiring short to earth/open circuit/short to positive, injector control module – supply voltage/earth connection
Intake air temperature (IAT) sensor	Wiring short to earth/open circuit/short to positive, IAT sensor
Knock sensor (KS)	Wiring short to earth/open circuit, KS, KS incorrectly tightened
Malfunction indicator lamp (MIL)	Wiring short to earth/open circuit/short to positive, supply voltage, MIL lamp
Manifold absolute pressure (MAP) sensor	TP sensor signal, wiring, MAP sensor
MIL to TCM – connection	Wiring
Random/multiple cylinder(s) – misfire detected	Ignition system, fuel supply, injectors
Supply voltage	Wiring open circuit/earth wire, engine control relay, injector control module – voltage supply/earth wire
Throttle position (TP) sensor	Wiring short to earth/open circuit/short to positive, supply voltage, TP sensor, mechanical fault
Vehicle speed signal	Wiring, ABS system defective



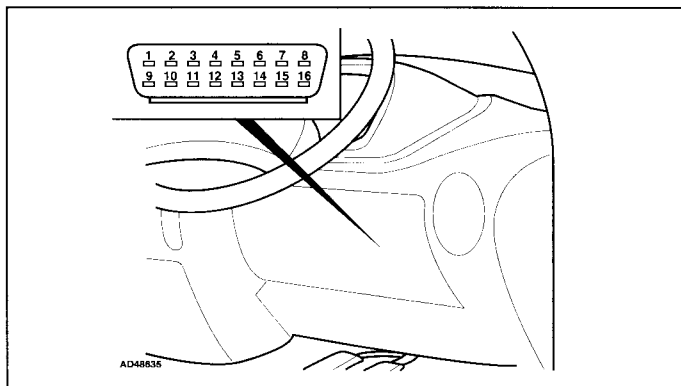


# RENAULT

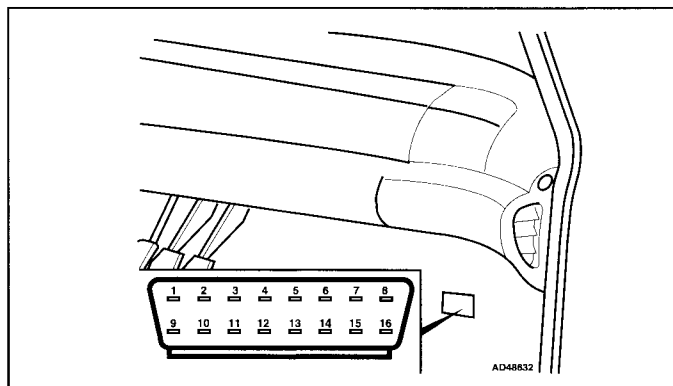
Model: Espace 1,9 dTi • Master 2,8D Turbo  
Year: 1998-02  
Engine code: F9Q 720/722, S9W 700  
System: Sagem • Bosch MSA 15.5

## Engine management

### Data link connector (DLC) locations



Master



Espace

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

#### Trouble code identification

Fault location	Probable cause
Accelerator pedal position (APP) sensor – F9Q 720/722	Wiring short to earth/open circuit/short to positive, APP sensor
Barometric pressure (BARO) sensor	ECM
Battery voltage – high/low	Wiring open circuit/earth wire, battery, alternator
Brake pedal position (BPP) switch	Wiring short to earth/open circuit, supply voltage, BPP switch
Clutch pedal position (CPP) switch	Wiring short to earth/open circuit, CPP switch
Crankshaft position (CKP) sensor – signal	Wiring, CKP sensor, flywheel – 4 slots at 90°
Engine control module (ECM)	ECM
Engine control relay	Wiring short to earth/open circuit, engine control relay
Engine coolant heater relay 1 & 2	Wiring short to earth/open circuit/short to positive, coolant heater relay
Engine coolant 'hot' warning lamp	Wiring short to earth/open circuit/short to positive, supply voltage, warning lamp



Fault location	Probable cause
Engine coolant temperature (ECT) sensor	Wiring short to earth/open circuit, ECT sensor
Exhaust gas recirculation (EGR) solenoid	Wiring short to earth/open circuit/short to positive, supply voltage, EGR solenoid
Fuel injection timing solenoid	Wiring short to earth/open circuit/short to positive, supply voltage, timing solenoid
Fuel lever position sensor – S9W 700	Wiring short to earth/open circuit/short to positive, sensor
Fuel quantity adjuster position adjuster/sensor	Wiring short to earth/open circuit/short to positive, supply voltage, injection pump
Fuel shut-off solenoid	Wiring short to earth/open circuit/short to positive, earth connection, shut-off solenoid
Fuel temperature sensor	Wiring short to earth/open circuit/short to positive, fuel temperature sensor
Glow plug control module	Wiring short to earth/open circuit/short to positive, earth connection, glow plugs, glow plug control module
Glow plug warning lamp	Wiring short to earth/open circuit/short to positive, supply voltage, warning lamp
Idle speed control (ISC) actuator	Wiring short to earth/open circuit/short to positive, heated windscreen timer unit, ISC actuator
Ignition switch – start signal	Wiring open circuit
Immobilizer – signal	Wiring, incorrectly coded, immobilizer defective
Injector needle lift sensor	Wiring short to earth/open circuit/short to positive, injector
Intake air temperature (IAT) sensor	Wiring short to earth/open circuit/short to positive, IAT sensor
Mass air flow (MAF) sensor	Wiring short to earth/open circuit/short to positive, supply voltage, intake system, MAF sensor
Supply voltage – high/low	Wiring, earth wire, alternator, battery
Vehicle speed signal	Wiring, ABS system, mechanical fault



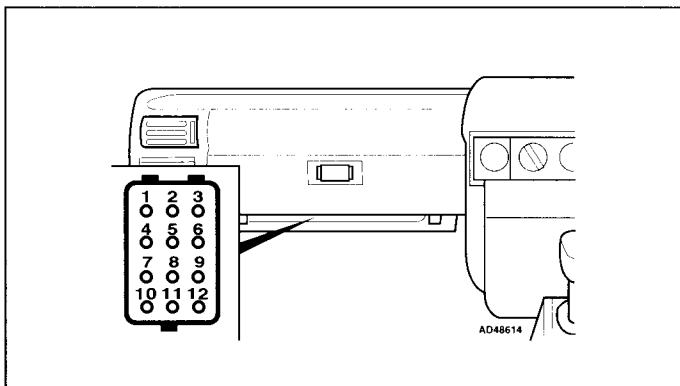


# RENAULT

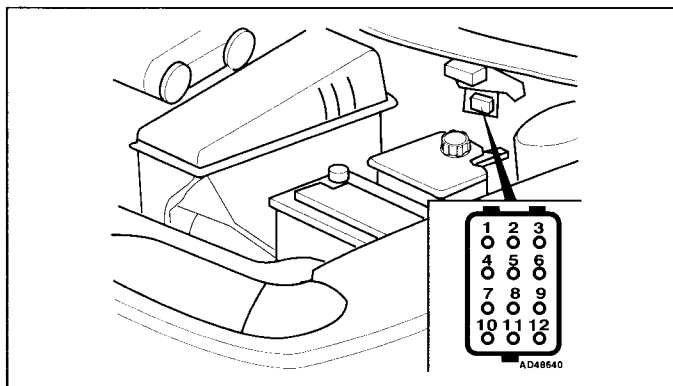
Model: Clio • R19 • R21 • Laguna • Safrane  
Espace  
Year: 1991-02  
System: AD4-000/002/003/004/006 • AR4 • AD8

Transmission

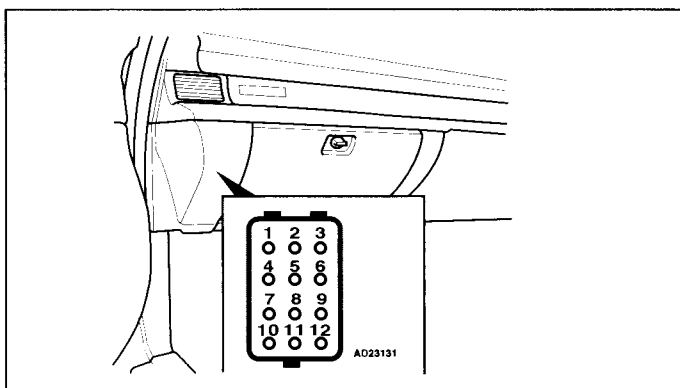
## Data link connector (DLC) locations



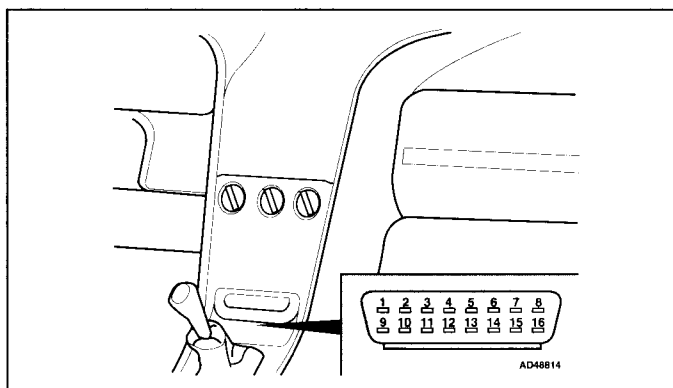
Clio



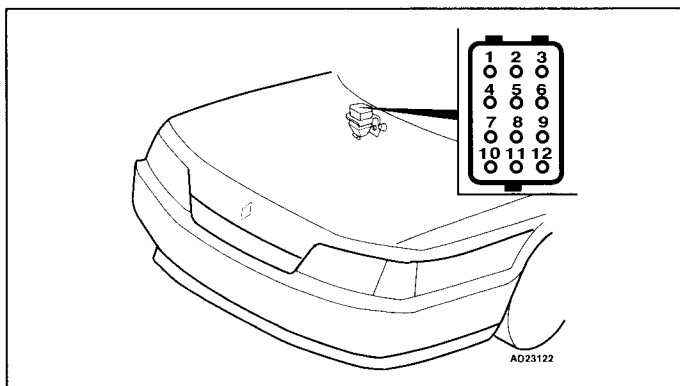
Laguna →1996



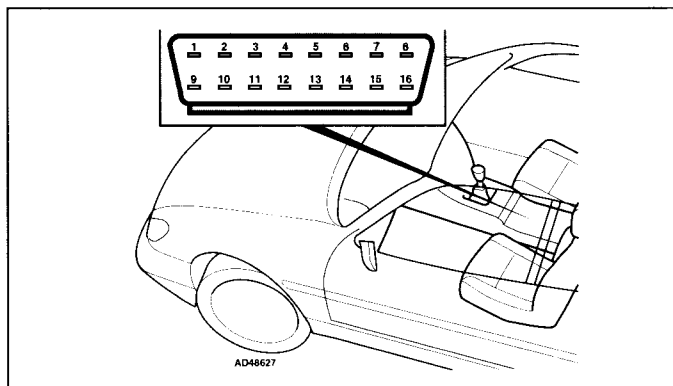
R19



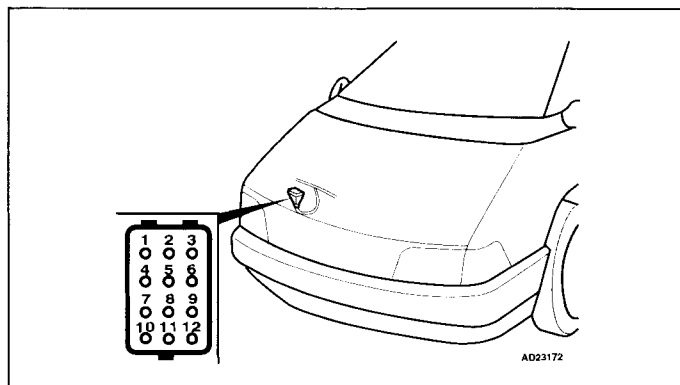
Laguna 1997 →



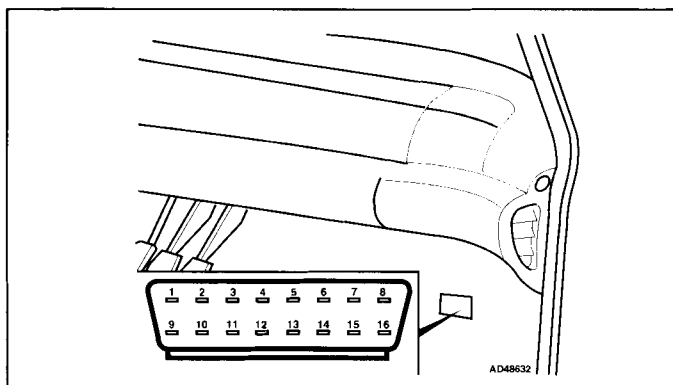
R21



Safrane



Espace – →1995



Espace – 1996→

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The transmission control module (TCM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

**NOTE:** *The full load and no load position of the accelerator pedal must be programmed using diagnostic equipment after the TCM fault memory has been erased.*

### Trouble code identification

Fault location	Probable cause
AC compressor clutch cut-off relay	Fuse, wiring short to earth/open circuit, supply voltage, cut-off relay
Shift solenoid (SS) 1	Wiring short to earth/open circuit, solenoid valve, TCM
Shift solenoid (SS) 2	Wiring short to earth/open circuit, solenoid valve, TCM
Shift solenoid (SS) 3	Wiring short to earth/open circuit, solenoid valve, TCM
Shift solenoid (SS) 4	Wiring short to earth/open circuit, solenoid valve, TCM
Pressure modulating solenoid	Wiring short to earth/open circuit, solenoid valve, TCM
Throttle position (TP) sensor	Wiring short to earth/open circuit, TP sensor
Transmission fluid pressure (TFP) sensor	Transmission fluid level low, wiring short to earth/open circuit/short to positive, supply voltage, fluid pressure sensor, transmission mechanical fault, TCM
Transmission fluid temperature (TFT) sensor – circuit malfunction	Wiring short to earth/open circuit/short to positive, supply voltage, TP sensor, transmission valve block, TCM
Transmission range (TR) switch	Wiring short to earth/open circuit/short to positive, earth connection, starter motor relay, TR switch, TCM
Vehicle speed sensor (VSS)	Wiring short to earth/open circuit, VSS





# RENAULT

Model: Clio 1,6 • Mégane/Mégane Scénic 2,0  
Mégane/Scénic 1,6/2,0 • Laguna 2,0  
Scénic 1,9D Turbo • Espace 2,0 16V

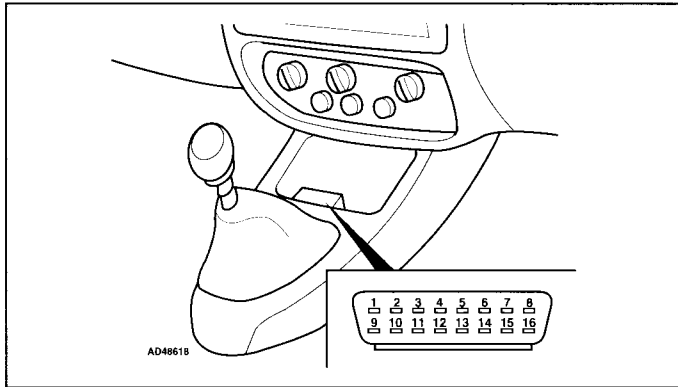
Year: 1995-02

Engine code: F3R 611, F3R 791, F4R 700/701, F4R 740/741,  
F9Q 731, K4M 700/1, K7M 745

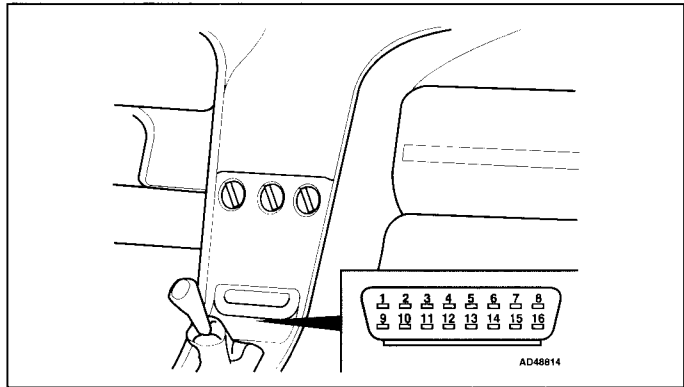
System: DPO

Transmission

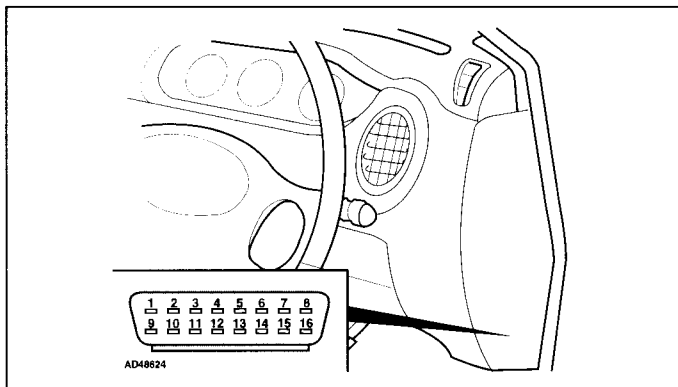
## Data link connector (DLC) locations



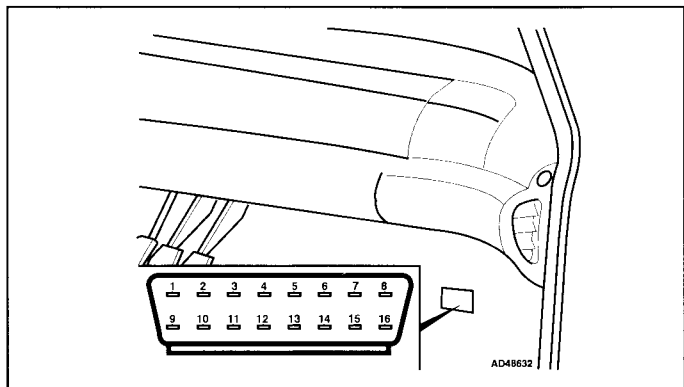
Clio



Laguna



Mégane/Mégane Scénic/Scénic



Espace

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The transmission control module (TCM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

**NOTE:** The full load and no load position of the accelerator pedal must be programmed using diagnostic equipment after the TCM fault memory has been erased.



## Trouble code identification

Fault location	Probable cause
AC compressor clutch cut-off	Wiring short to earth/open circuit/short to positive
Engine load signal – TP sensor signal	Wiring short to earth/open circuit, TP sensor
Engine speed (RPM) – signal	Wiring short to earth/open circuit/short to positive, high voltage interference, TCM, ECM
Engine torque signal	Wiring short to earth/open circuit/short to positive
Exchanger flow control solenoid – circuit	Wiring short to earth/open circuit/short to positive, control solenoid, TCM
Pressure modulating solenoid	Wiring short to earth/open circuit/short to positive, pressure modulating solenoid
Shift solenoid (SS) 1	Wiring short to earth/open circuit/short to positive, solenoid valve, TCM
Shift solenoid (SS) 2	Wiring short to earth/open circuit/short to positive, solenoid valve, TCM
Shift solenoid (SS) 3	Wiring short to earth/open circuit/short to positive, solenoid valve, TCM
Shift solenoid (SS) 4	Wiring short to earth/open circuit/short to positive, solenoid valve, TCM
Shift solenoid (SS) 5	Wiring short to earth/open circuit/short to positive, solenoid valve, TCM
Shift solenoid (SS) 6	Wiring short to earth/open circuit/short to positive, solenoid valve, TCM
Shift solenoids – supply voltage	Wiring open circuit/short to positive
TCM/ECM connection – ECT/torque information	Wiring short to earth/open circuit/short to positive, TCM, ECM
TCM/ECM connection – load information	Wiring short to earth/open circuit/short to positive, TCM, ECM
Torque converter clutch (TCC) – slipping	TCC solenoid, transmission fluid, torque converter, transmission valve block
Torque converter clutch (TCC) solenoid	Wiring short to earth/open circuit/short to positive, TCC solenoid
Transmission control module (TCM) – full load/no load position not programmed	TCM programming error
Transmission control module (TCM)	TCM
Transmission fluid	Change fluid, reset TCM fluid age counter
Transmission fluid pressure (TFP) sensor	Wiring short to earth/open circuit/short to positive, TFP sensor
Transmission fluid pressure (TFP) – regulation	Pressure modulating solenoid, torque converter clutch (TCC) solenoid, transmission fluid level/quality, TFP sensor – transmission valve block
Transmission fluid pressure (TFP) sensor/TFT sensor – supply voltage	Wiring short to earth/short to positive, TFP sensor, TFT sensor
Transmission fluid temperature (TFT) sensor	Wiring short to earth/open circuit/short to positive, TFT sensor
Transmission range (TR) switch	Wiring short to earth/open circuit, TR switch
Transmission range (TR) switch – PNP signal	Wiring short to earth/open circuit, TR switch

**RENAULT**Model: Clio 1,6 • Mégane/Mégane Scénic 2,0 • Mégane/Scénic 1,6/2,0  
Laguna 2,0 • Scénic 1,9D Turbo • Espace 2,0 16V**Transmission**

<b>Fault location</b>	<b>Probable cause</b>
Transmission shift hold solenoid	Wiring short to earth/open circuit/short to positive, shift hold solenoid
Transmission speed sensor – no signal/signal variation	Wiring short to earth/open circuit/short to positive, high voltage interference, transmission speed sensor
Transmission warning lamp	Wiring short to earth/open circuit/short to positive
Turbine shaft speed (TSS) sensor – no signal/signal variation	Wiring short to earth/open circuit/short to positive, high voltage interference, TSS sensor
Torque reduction signal	Wiring short to earth/open circuit/short to positive



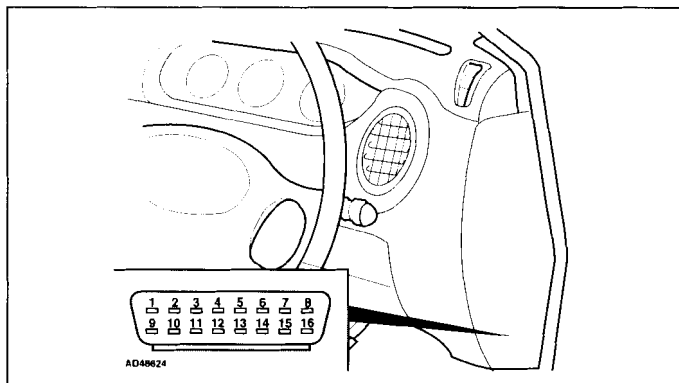


Model: Mégane/Mégane Scénic • Laguna • Safrane  
Year: 1995-02  
System: AD4-013/021/025 • AD8

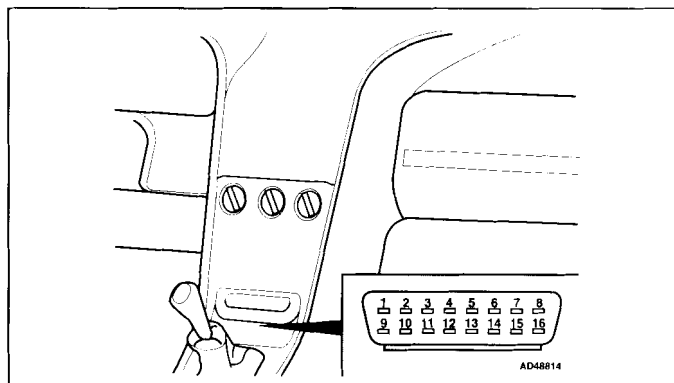
RENAULT

Transmission

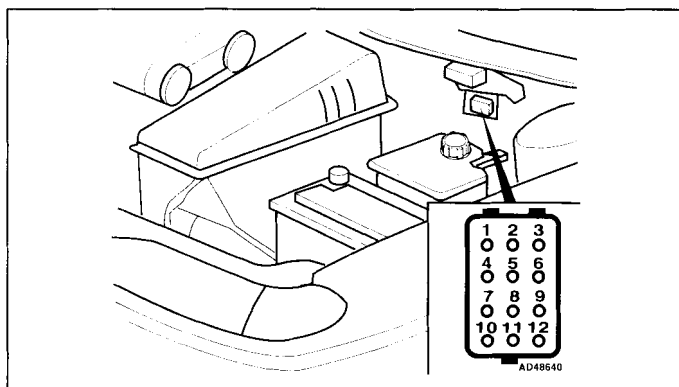
## Data link connector (DLC) locations



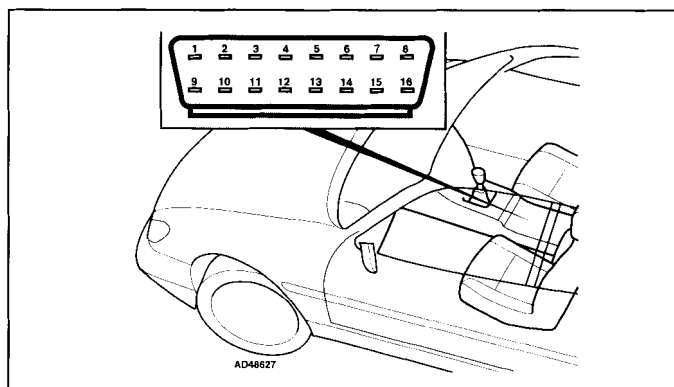
Mégane/Mégane Scénic



Laguna 1997 →



Laguna →1996



Safrane

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The transmission control module (TCM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

**NOTE:** The full load and no load position of the accelerator pedal must be programmed using diagnostic equipment after the TCM fault memory has been erased.

**RENAULT**

Model: Mégane/Mégane Scénic • Laguna • Safrane

**Transmission****Trouble code identification**

<b>Fault location</b>	<b>Probable cause</b>
AC control module – compressor clutch cut-off	Wiring short to earth/open circuit/short to positive, TCM programming error
Engine RPM input – no signal	Wiring short to earth/open circuit, ECM, TCM
Engine torque signal	Wiring short to earth/open circuit/short to positive, torque reduction solenoid – diesel, ECM
Fuel lever position sensor – diesel	Wiring short to earth/open circuit, TP sensor
Glow plug control module – diesel	Wiring short to earth/open circuit/short to positive
Pressure modulating solenoid	Wiring short to earth/open circuit/short to positive, supply voltage, solenoid valve, TCM
Shift solenoid (SS) 1	Wiring short to earth/open circuit/short to positive, supply voltage, solenoid valve, TCM
Shift solenoid (SS) 2	Wiring short to earth/open circuit/short to positive, supply voltage, solenoid valve, TCM
Shift solenoid (SS) 3	Wiring short to earth/open circuit/short to positive, supply voltage, solenoid valve, TCM
Shift solenoid (SS) 4	Wiring short to earth/open circuit/short to positive, supply voltage, solenoid valve, TCM
Throttle position (TP) sensor – petrol	Wiring short to earth/open circuit, TP sensor
Transmission control module (TCM)	TCM
Transmission control module (TCM) – full load/no load position not programmed	TCM programming error
Transmission control module (TCM) – overheating	TCM mounting, underbonnet temperature too high
Transmission fluid pressure (TFP) – regulation	Transmission fluid level, wiring short to earth/open circuit/short to positive, fluid pressure sensor
Transmission fluid pressure (TFP) sensor – supply voltage	Wiring short to earth/open circuit/short to positive, TFP sensor
Transmission fluid pressure (TFP) sensor	Transmission fluid level low, wiring short to earth/open circuit/short to positive, supply voltage, TFP sensor, shift solenoid – modulating, TCM
Transmission fluid temperature (TFT) sensor	Wiring short to earth/open circuit, TFT sensor, TCM
Transmission range (TR) switch	Wiring short to earth/open circuit/short to positive, starter motor relay, TR switch
Transmission speed/engine speed	Transmission fluid level, vehicle speed sensor (VSS), engine speed (RPM) sensor, mechanical fault
Transmission warning lamp	Wiring short to positive, TCM
Vehicle speed sensor (VSS)	Wiring short to earth/open circuit, VSS, TCM



Model: Extra/Rapid/Express • Kangoo • Clio • R19/21  
 Mégane/Scénic • Laguna • Safrane  
 Espace/Trafic

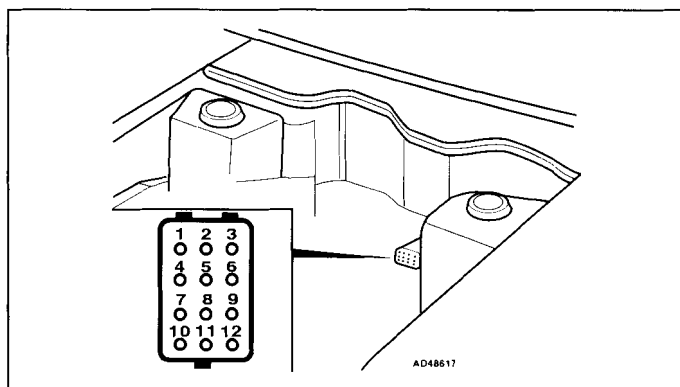
Year: 1994-02

**RENAULT**

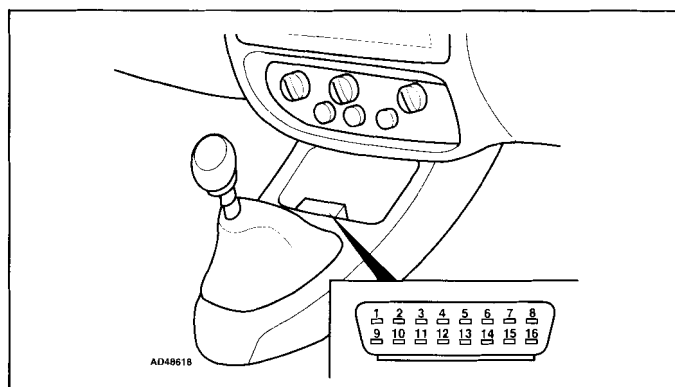


Immobilizer

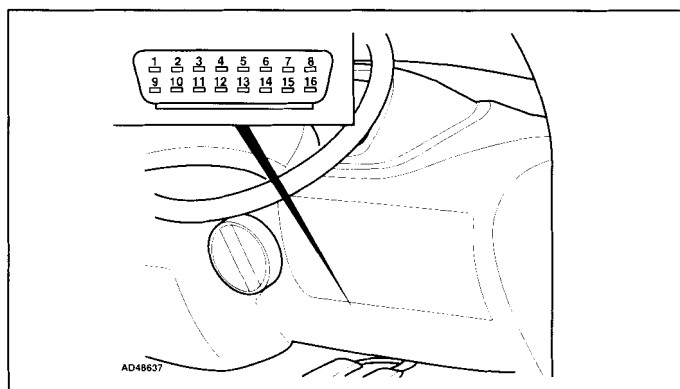
## Data link connector (DLC) locations



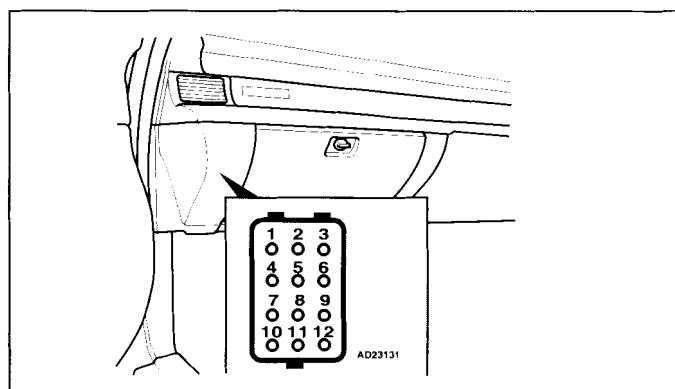
Extra/Rapid/Express – engine bay



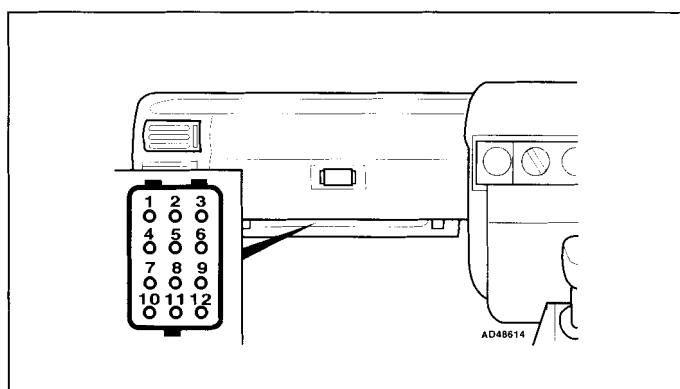
Clio 1998 →



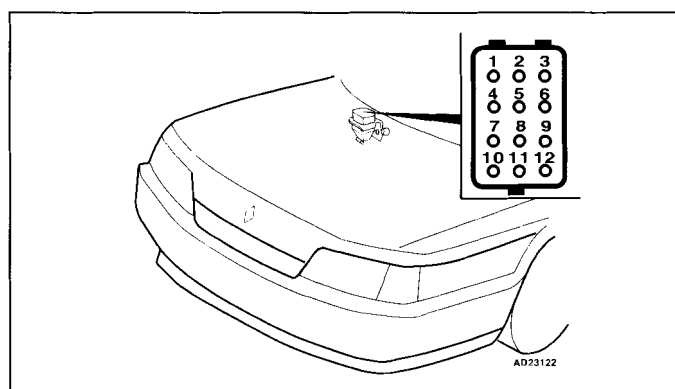
Kangoo



R19



Clio →1997



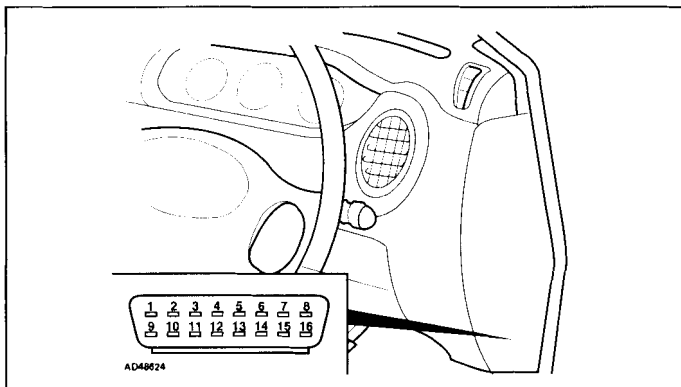
R21



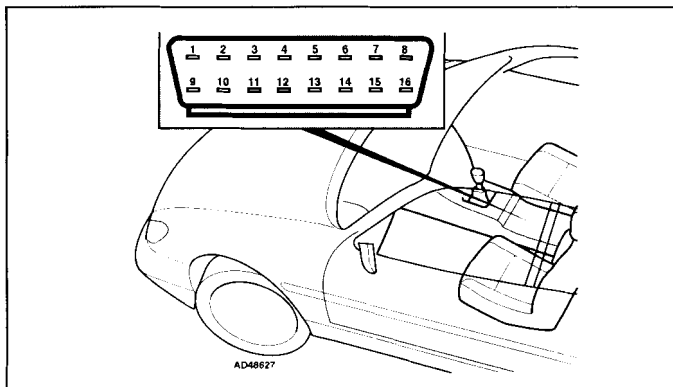
# RENAULT

Model: Extra/Rapid/Express • Kangoo • Clio • R19/21  
Mégane/Scénic • Laguna • Safrane • Espace/Trafic

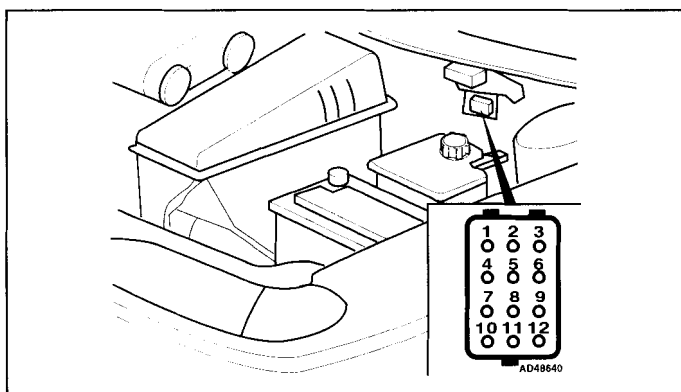
## Immobilizer



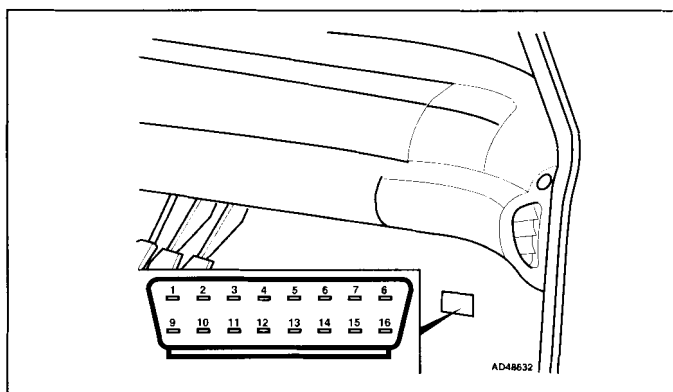
Mégane/Mégane Scénic/Scenic



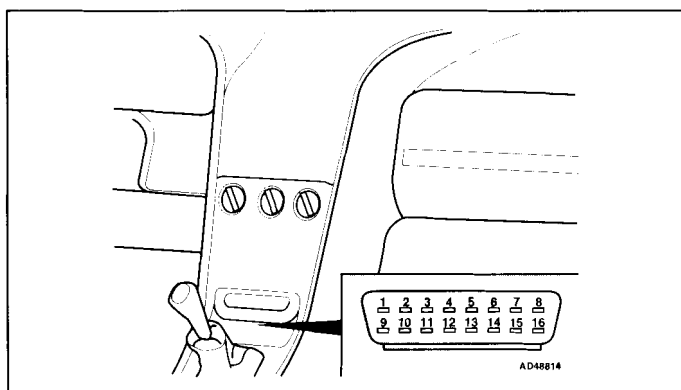
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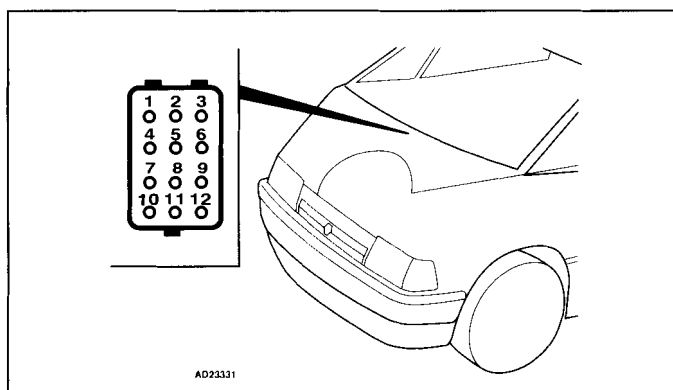
Laguna →1996



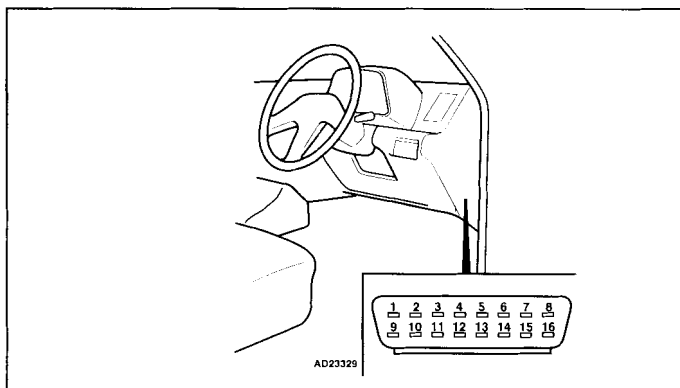
Espace



Laguna 1997 →



Trafic – 12-pin



Trafic – 16-pin

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The immobilizer control module fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

### Trouble code identification

Fault location	Probable cause
Central locking master switch	Wiring short to earth, master switch
Fuel shut-off solenoid – diesel	Fuel shut-off solenoid, inertia fuel shut-off (IFS) switch, immobilizer control module
Fuel shut-off solenoid/signal – diesel	Wiring, fuel shut-off solenoid, immobilizer control module
Immobilizer control module/engine control module (ECM) – petrol – communication	Wiring short to earth/short to positive, immobilizer control module, ECM
Immobilizer reader coil	Wiring short to earth/open circuit/short to positive, reader coil, ECM
Immobilizer warning lamp	Wiring short to earth/open circuit/short to positive, immobilizer control module





# ROVER

Model: Mini • Metro/100 • Montego • 200/400  
200 Cabrio/Coupe • 400/Tourer • 620/820/Turbo  
825 • MGF

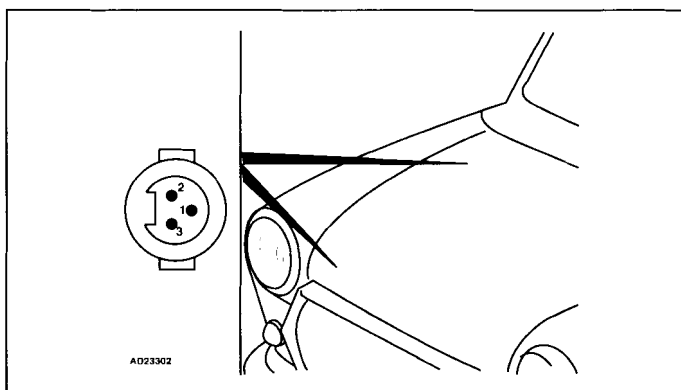
Year: 1989-02

Engine code: 11K2D, 12A2DF75/6, 12A2EF77, 12A2EK71/2,  
12A2LK70, 14K16, 14K2A/D, 14K4, 14K4C/D,  
14K4F, 14K8, 16K16, 18K16, 20HE36/7, 20M4, 20T,  
20T4, K16-1,4, K16-1,6, K16-1,8, K18, K8-1,1,  
K8-1,4, KV6

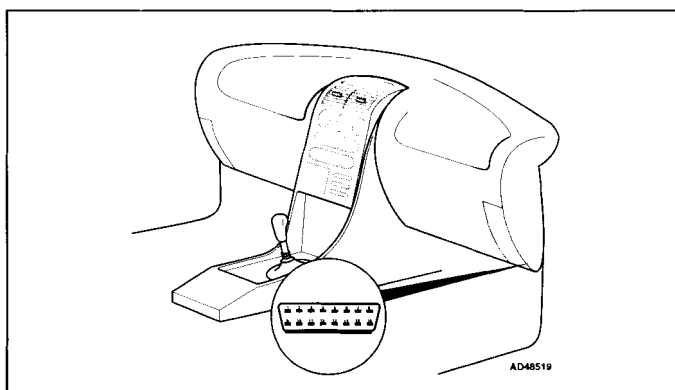
System: Rover MEMS

Engine management

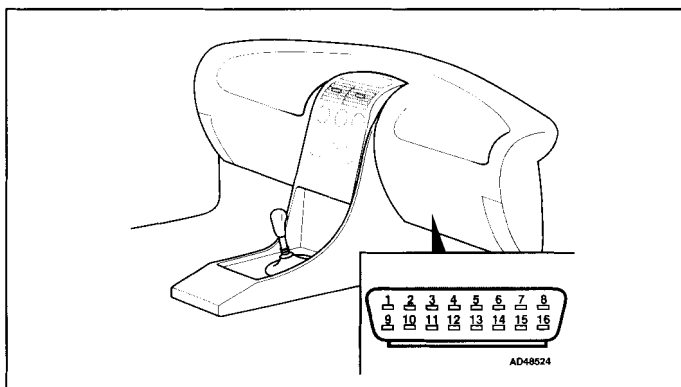
## Data link connector (DLC) locations



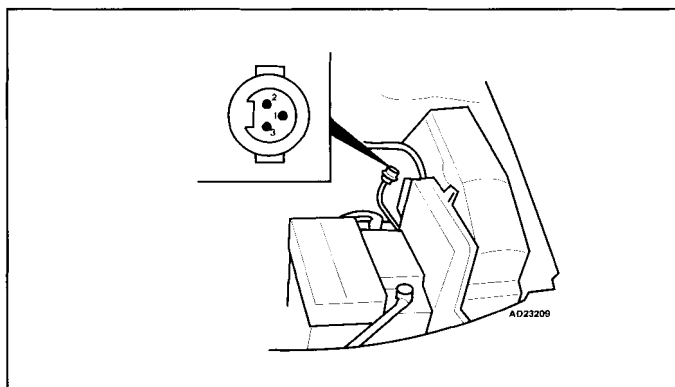
Mini →1992 engine bay front – 1993-96 engine bay rear



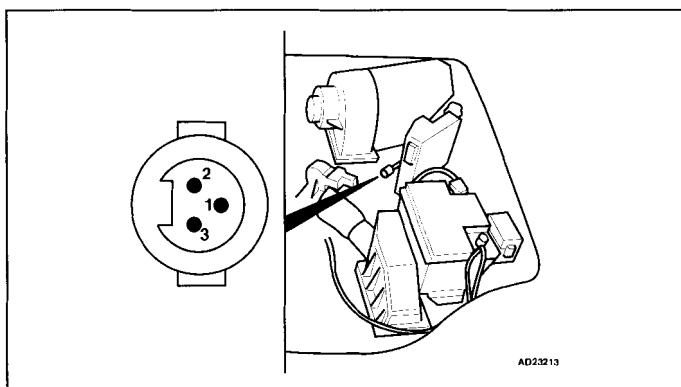
100 1996 →/400 1995 →/MGF/200 1995 →



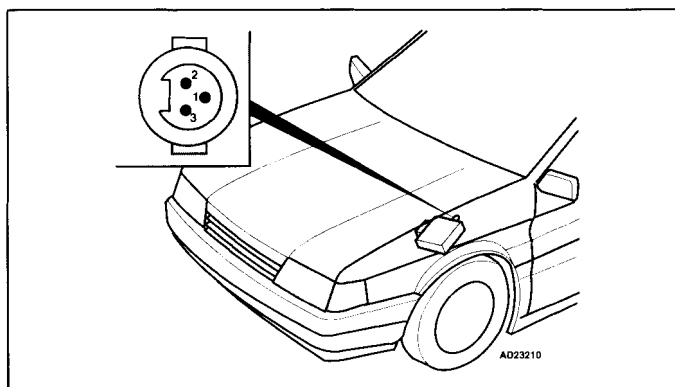
Mini 1997 →



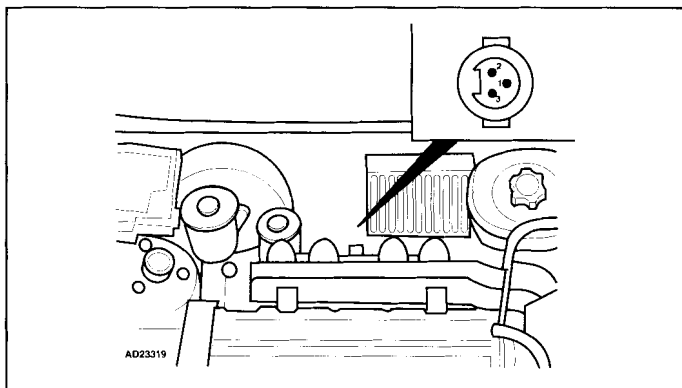
200/Cabrio/Coupe/400/Tourer →1994



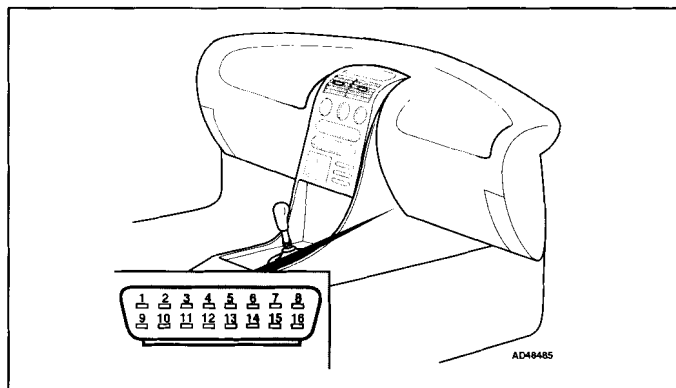
Metro/100 →1995



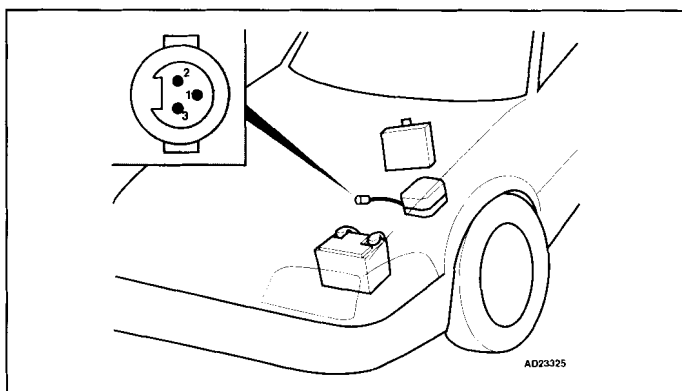
Montego



620 Turbo



820/825/Turbo 1995 →



820/Turbo →1994

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- No digital trouble codes available from vehicle manufacturer.
- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment able to display fault locations as a text description.

**ROVER**Model: Mini • Metro/100 • Montego • 200/400 • 200 Cabrio/Coupe  
400/Tourer • 620/820/Turbo • 825 • MGF**Engine management****Trouble code identification**

<b>Fault location</b>	<b>Probable cause</b>
AC compressor clutch relay	Wiring short to earth/open circuit, supply voltage, AC compressor clutch relay
Alternator load signal	Alternator, battery, wiring open circuit/short to positive
Camshaft position (CMP) actuator	Wiring short to earth/open circuit, CMP actuator
Camshaft position (CMP) sensor	Wiring short to earth/open circuit/short to positive, supply voltage, CMP sensor, ECM
Crankshaft position (CKP) sensor	Wiring short to earth/open circuit/short to positive, supply voltage, CKP sensor, ECM
Engine coolant blower motor relay 1	Fuse, wiring short to earth/open circuit/short to positive, supply voltage, engine coolant blower motor relay
Engine coolant blower motor relay 2	Fuse, wiring short to earth/open circuit/short to positive, supply voltage, engine coolant blower motor relay
Engine coolant temperature (ECT) gauge	Fuse, wiring short to earth/open circuit/short to positive, ECT gauge
Engine coolant temperature (ECT) sensor	Wiring short to earth/open circuit, ECT sensor
Engine oil temperature gauge	Fuse, wiring short to earth/open circuit/short to positive, engine oil temperature gauge
Evaporative emission (EVAP) canister purge valve	Wiring short to earth/open circuit/short to positive, supply voltage, EVAP canister purge valve
Exhaust gas pressure sensor	Exhaust system, catalytic converter, wiring short to earth/open circuit/short to positive, exhaust gas pressure sensor
Exhaust gas recirculation (EGR) solenoid	Wiring short to earth/open circuit/short to positive, supply voltage, EGR solenoid
Fuel consumption signal	Wiring short to earth/open circuit/short to positive, ECM
Fuel pump relay	Fuse, wiring short to earth/open circuit, supply voltage, fuel pump relay
Fuel temperature sensor	Wiring short to earth/open circuit, fuel temperature sensor
Intake air temperature (IAT) sensor	Wiring short to earth/open circuit, IAT sensor
Intake manifold air control solenoid	Wiring short to earth/open circuit/short to positive, supply voltage, intake manifold air control solenoid
Manifold absolute pressure (MAP) sensor	Vacuum hose blocked/leak, wiring short to earth/open circuit, MAP sensor, ECM
Misfire detected – catalytic converter	Ignition system, injector(s), wiring
Misfire detected	Ignition system, injector(s), wiring
Outside air temperature sensor	Wiring short to earth/open circuit/short to positive, outside air temperature sensor
Oxygen sensor (O2S)	Wiring short to earth/open circuit/short to positive, heater circuit, earth connection, exhaust leak, O2S
Tachometer	Wiring short to earth/open circuit, tachometer
Throttle body heater	Fuse, wiring short to earth/open circuit, supply voltage, heater relay, throttle body heater
Throttle position (TP) sensor	Wiring short to earth/open circuit/short to positive, TP sensor, supply voltage, ECM
Throttle position (TP) sensor – supply voltage	Wiring short to earth/open circuit/short to positive, TP sensor, ECM
Turbocharger (TC) boost pressure gauge	Wiring short to earth/open circuit/short to positive, TC boost pressure gauge
Turbocharger (TC) wastegate regulating valve	Wiring short to earth/open circuit/short to positive, supply voltage, hoses blocked/leaking, TC wastegate regulating valve





Model: 25 1,1/1,4/1,6/1,8/1,8 VVC • 45 1,4/1,6/1,8/2,0  
75 1,8/1,8 Turbo/2,0/2,5 • MG TF 1,6/1,8  
MG ZR 1,4 • MG ZR 1,8/1,8 VVC • MG ZS 1,6/1,8  
MG ZS 2,5 • MG ZT/ZT-T 1,8 • MG ZT/ZT-T 2,5

Year: 1999-04

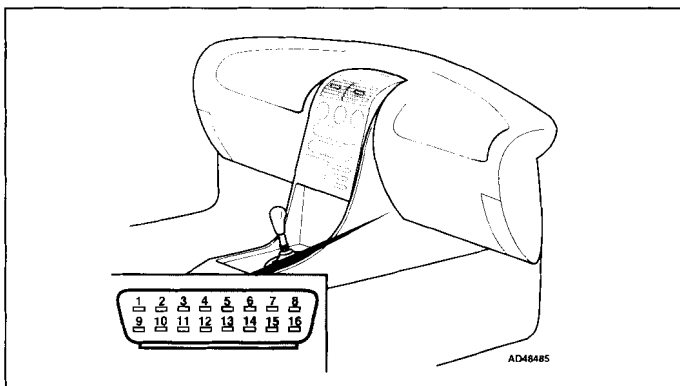
Engine code: K8, K16, KV6

System: MEMS 3 • Siemens EMS 2000

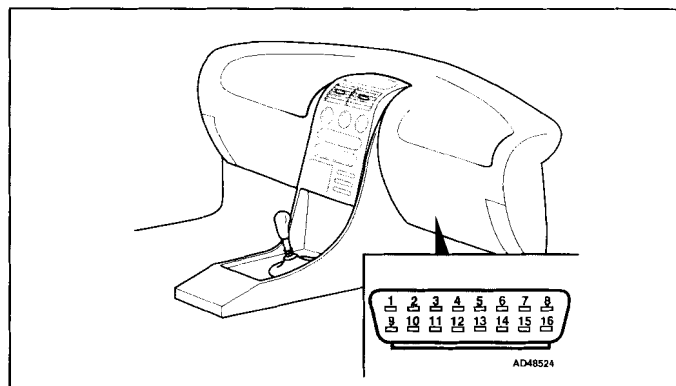
**ROVER**

Engine management/transmission

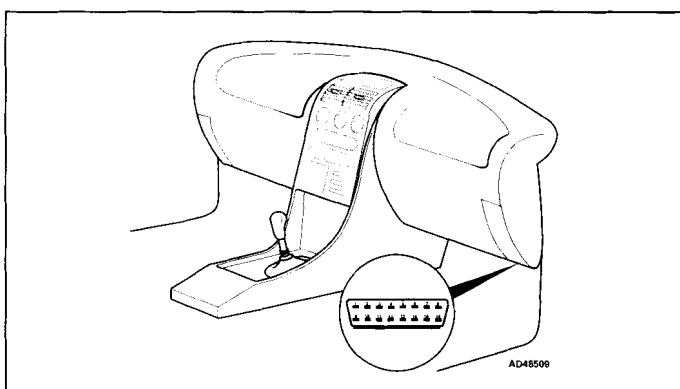
## Data link connector (DLC) locations



Except 75/MG TF/MG ZT – under fascia, driver's side



75/MG ZT – under fascia, driver's side



MG TF – above fascia fusebox/relay plate, driver's side



## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

	<b>ROVER</b>	Model: 25 1,1/1,4/1,6/1,8/1,8 VVC • 45 1,4/1,6/1,8/2,0 • 75 1,8/1,8 Turbo/2,0/2,5 • MG TF 1,6/1,8 MG ZR 1,4 • MG ZR 1,8/1,8 VVC • MG ZS 1,6/1,8 • MG ZS 2,5 • MG ZT/ZT-T 1,8 • MG ZT/ZT-T 2,5
	<b>Engine management/transmission</b>	

## Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	-
P1185	Heated oxygen sensor (HO2S) 1, bank 1, heater – circuit malfunction	Wiring, HO2S, ECM
P1186	Heated oxygen sensor (HO2S) 1, bank 1, heater – circuit malfunction	Wiring, HO2S, ECM
P1191	Heated oxygen sensor (HO2S) 2, bank 1, heater – circuit malfunction	Wiring, HO2S, ECM
P1192	Heated oxygen sensor (HO2S) 2, bank 1, heater – circuit malfunction	Wiring, HO2S, ECM
P1230	Fuel pump relay – open circuit	Wiring, fuel pump relay, ECM
P1231	Fuel pump relay – circuit malfunction	Wiring, fuel pump relay, ECM
P1232	Fuel pump relay – circuit malfunction	Wiring, fuel pump relay, ECM
P1300	Random/multiple cylinder(s) – misfire detected	Spark plug(s), HT lead(s), injector(s), ignition coil(s), low compression, wiring
P1316	Random/multiple cylinder(s) – misfire detected	Spark plug(s), HT lead(s), injector(s), ignition coil(s), low compression, wiring
P1319	Misfire detected with low fuel level	Low fuel level
P1320	Crankshaft position sensor – misfire detection, adaption limit	Wiring, CKP sensor, ignition system, mechanical fault, ECM
P1321	Crankshaft position sensor – misfire detection, tooth error	Engine mechanical fault, wiring, CKP sensor, ECM
P1470	Intake air flap control actuator 1 – stuck open	Wiring, intake air flap control actuator, mechanical fault, ECM
P1471	Intake air flap control actuator 1 – stuck closed	Wiring, intake air flap control actuator, mechanical fault, ECM
P1472	Intake air flap control actuator 2 – stuck open	Wiring, intake air flap control actuator, mechanical fault, ECM
P1473	Intake air flap control actuator 2 – stuck closed	Wiring, intake air flap control actuator, mechanical fault, ECM
P1474	Intake air flap control actuator 1 – short circuit to positive	Wiring, intake air flap control actuator, ECM
P1475	Intake air flap control actuator 1 – open circuit/short circuit to earth	Wiring, intake air flap control actuator, ECM
P1476	Intake air flap control actuator 2 – short circuit to positive	Wiring, intake air flap control actuator, ECM
P1477	Intake air flap control actuator 2 – open circuit/short circuit to earth	Wiring, intake air flap control actuator, ECM
P1506	Idle speed control (ISC) system – circuit malfunction	Wiring, IAC valve, ECM
P1507	Idle speed control (ISC) system – circuit malfunction	Wiring, IAC valve, ECM
P1508	Idle speed control (ISC) system – circuit malfunction	Wiring, IAC valve, ECM
P1537	AC compressor clutch – circuit malfunction	AC compressor clutch, AC compressor clutch relay, wiring, ECM
P1538	AC compressor clutch – circuit malfunction	AC compressor clutch, AC compressor clutch relay, wiring, ECM
P1565	Cruise control system relay – short circuit to positive	Wiring, cruise control system relay, ECM

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1566	Cruise control system relay – open circuit/short circuit to earth	Wiring, cruise control system relay, ECM
P1590	Rough road sensor – signal malfunction	Wiring, rough road sensor
P1610	Engine control relay – circuit malfunction	Wiring, engine control relay, ECM
P1611	Engine control relay – circuit malfunction	Wiring, engine control relay, ECM
P1640	CAN data bus – malfunction	Wiring, connected system, ECM
P1641	CAN data bus – defective	Trouble code(s) stored in other system(s), wiring
P1646	CAN data bus, TCM – communication error	TCM trouble code(s) stored, wiring, ECM
P1666	Immobilizer signal – CAN data bus	Wiring, immobilizer control module
P1672	Immobilizer signal – incorrect code	Incorrect key, immobilizer control module
P1775	CAN data bus, TCM – transmission warning lamp request	Transmission, wiring, ECM/TCM
P1785	Transmission ratio control motor – drive over temperature	Transmission ratio control motor, wiring, ECM/TCM
P1787	Transmission ratio control motor – open circuit	Wiring, transmission ratio control motor, ECM/TCM
P1788	Transmission ratio control motor – high current	Wiring, transmission ratio control motor, ECM/TCM
P1810	Transmission selector lamp – circuit malfunction	Wiring, transmission selector lamp, TCM
P1815	Transmission gear selection switch, up shift – signal malfunction	Wiring, transmission gear selection switch, TCM
P1815	Transmission gear selection switch, down shift – signal malfunction	Wiring, transmission gear selection switch, TCM
P1830	Transmission control module (TCM) – circuit malfunction	Wiring, TCM, ECM
P1831	Transmission control module (TCM) – circuit malfunction	Wiring, TCM, ECM
P1836	Serial communication, gear shift – circuit malfunction	Wiring, poor connection, ECM/TCM
P1837	Instrument panel – circuit malfunction	Wiring, instrument panel, ECM
P1838	Instrument panel – circuit malfunction	Wiring, instrument panel, ECM





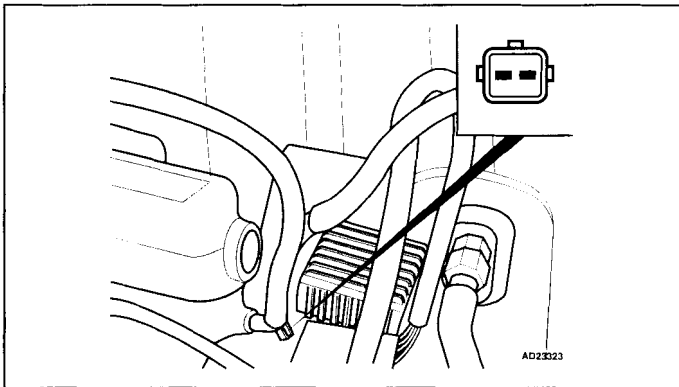
# ROVER

Model: 200/Coupe/Cabrio 1,6 • 400/Tourer 1,6



Engine management/transmission

## Data link connector (DLC) locations

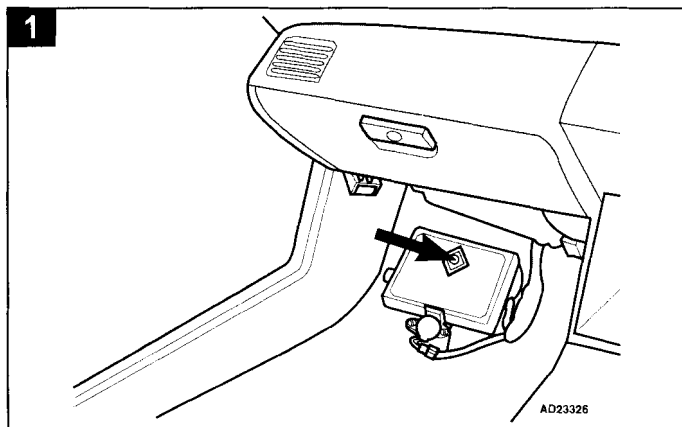


## Trouble codes

**NOTE:** Engine control module (ECM) incorporates transmission control function.

### General information

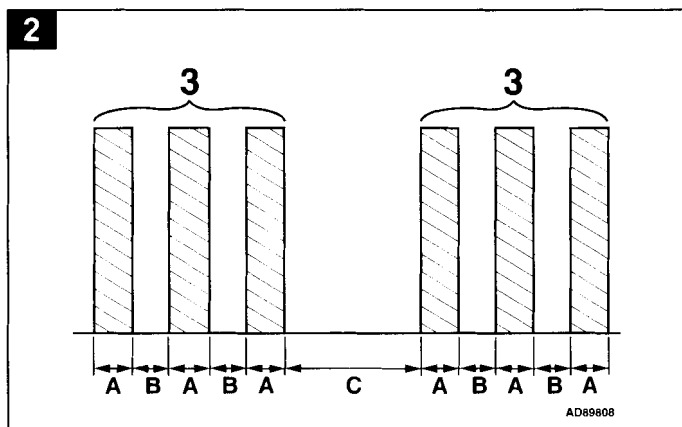
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the LED incorporated in the engine control module (ECM).
- Switch ignition ON. If MIL illuminates to indicate a fault but no trouble codes are stored, suspect DLC/MIL wiring, MIL or ECM.
- The ECM fault memory can also be checked using diagnostic equipment connected to the diagnostic socket

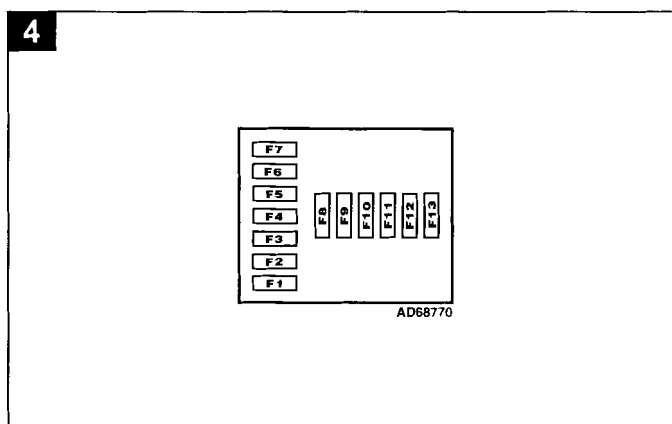
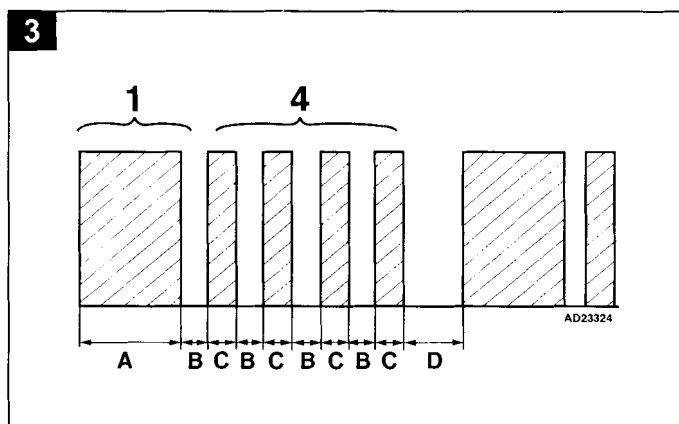


### Accessing

- Switch ignition ON. DO NOT start engine.
  - Count ECM LED flashes **1**.
  - Note trouble codes. Compare with trouble code table.
- NOTE:** No trouble codes stored if MIL illuminates continuously.

- Trouble codes 1-9 are indicated as follows:
  - Individual short flashes display trouble code **2** [A].
  - A short pause separates each flash **2** [B].
  - A long pause separates each trouble code **2** [C].
  - For example: Trouble code 3 displayed **2**.
- Trouble codes greater than 9 are indicated as follows:
  - Long flashes indicate the 'tens' of the trouble code **3** [A].
  - Short flashes indicate the 'units' of the trouble code **3** [C].
  - A short pause separates each flash **3** [B].
  - A long pause separates each trouble code **3** [D].
  - For example: Trouble code 14 displayed **3**.





### Erasing

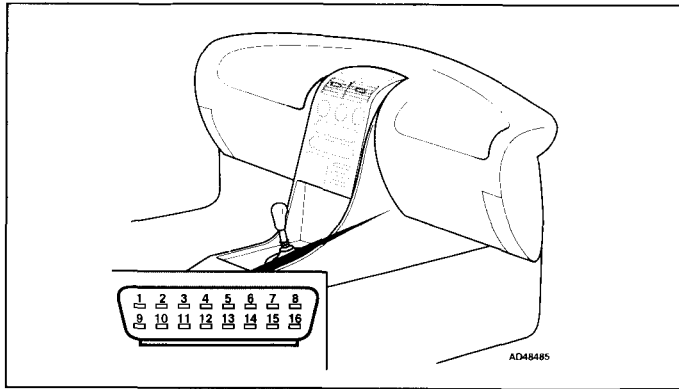
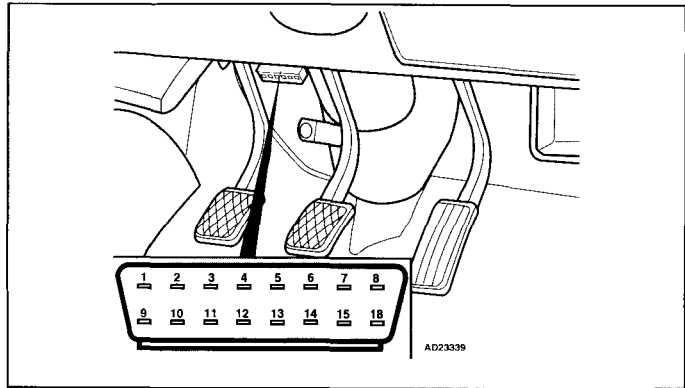
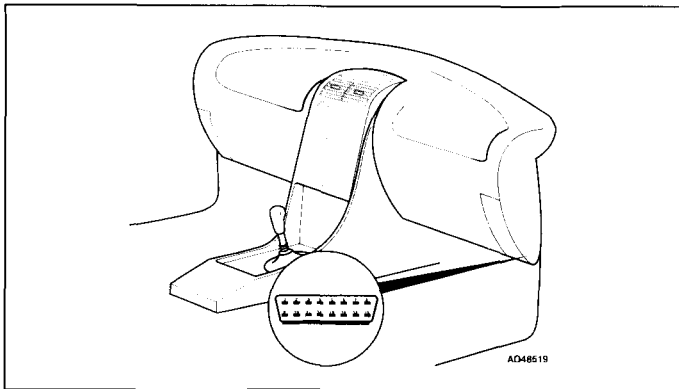
- Ensure ignition switched OFF.
- Remove F4 fuse (10A) from underbonnet fusebox **4**.
- Wait 10 seconds.
- Refit fuse.

### Trouble code identification

Flash type	Fault location	Probable cause
1	Heated oxygen sensor (HO2S)	Fuel pressure/pump, wiring short to earth/open circuit/short to positive, HO2S, ECM
3	Manifold absolute pressure (MAP) sensor – circuit	Wiring short to earth/open circuit/short to positive, supply voltage, MAP sensor, ECM
4	Engine speed (RPM) sensor	RPM sensor, wiring short to earth/open circuit, ECM
5	Manifold absolute pressure (MAP) sensor – signal	Intake leak, MAP sensor, wiring, ECM
6	Engine coolant temperature (ECT) sensor	Wiring short to earth/open circuit, ECT sensor, ECM
7	Throttle position (TP) sensor	Wiring short to earth/open circuit, TP sensor, ECM
8	Crankshaft position (CKP) sensor	CKP sensor, wiring short to earth/open circuit, ECM
9	Camshaft position (CMP) sensor	CMP sensor, wiring short to earth/open circuit, ECM
10	Intake air temperature (IAT) sensor	Wiring short to earth/open circuit, IAT sensor, ECM
11	Mixture adjustment resistor	Wiring short to earth/open circuit/short to positive, mixture adjustment resistor
13	Barometric pressure (BARO) sensor – circuit	Wiring short to earth/open circuit/short to positive, supply voltage, BARO sensor, ECM
14	Idle air control (IAC) valve	Wiring short to earth/open circuit/short to positive, IAC valve
15	Ignition amplifier – control circuit	Wiring short to earth/open circuit/short to positive, supply voltage, ignition amplifier, ECM
16	Injectors	Wiring short to earth/open circuit/short to positive, supply voltage, injector series resistor, injector, ECM
17	Vehicle speed sensor (VSS)	Speedometer/cable, wiring short to earth/open circuit, VSS
18	Ignition timing adjuster – circuit	Wiring short to earth, ignition timing adjuster
19	Torque converter clutch (TCC) solenoid – circuit malfunction	Fuse, wiring short to earth/open circuit, supply voltage, TCC solenoid, ECM

**ROVER**

Model: 200/400/600 2,0 TD  
 Year: 1995-99  
 Engine code: 20T2N  
 System: Bosch MSA 11

**Engine management****Data link connector (DLC) locations****200 – under fascia, driver's side****600 – under fascia, driver's side****400 – under fascia, driver's side****Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).
- If a trouble code is displayed but not listed in the trouble code table, suspect engine control module (ECM) fault.

**Accessing**

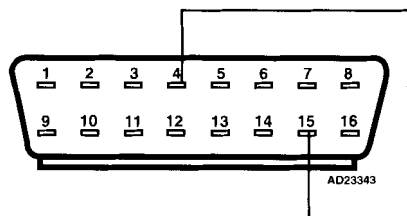
- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 4 and 15 **1**.
- Switch ignition ON. DO NOT start engine.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.

- Trouble codes are indicated as follows:

- Long flashes indicate the 'tens' of the trouble code **2** [A].
- Short flashes indicate the 'units' of the trouble code **2** [C].
- A short pause separates each flash **2** [B].
- A long pause separates each trouble code **2** [D].
- For example: Trouble code 12 displayed **2**.

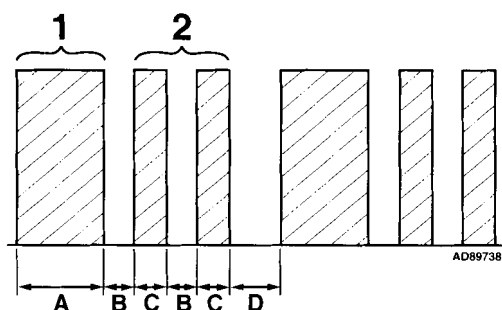
- Switch ignition OFF.
- Remove bridge wire.

1

**Erasing**

- Switch ignition ON.
- Switch ignition OFF.
- Repeat approximately 50 times.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

2

**Trouble code identification**

Flash type	Fault location	Probable cause
12	Start of diagnosis	—
14	Engine coolant temperature (ECT) sensor – low voltage	Wiring short to earth, supply voltage, ECT sensor, ECM
15	Engine coolant temperature (ECT) sensor – high voltage	Wiring open circuit/short to positive, ECT sensor, ECM
16	Fuel temperature sensor – low voltage	Wiring short to earth, supply voltage, fuel temperature sensor, ECM
17	Fuel temperature sensor – high voltage	Wiring open circuit/short to positive, fuel temperature sensor, ECM
19	Crankshaft position (CKP) sensor – plausibility	Wiring short to earth/open circuit, CKP sensor, ECM
21	Accelerator pedal position (APP) sensor – high voltage	Wiring short to earth/open circuit/short to positive, APP sensor, ECM
22	Accelerator pedal position (APP) sensor – low voltage	Wiring short to earth/open circuit, APP sensor, ECM
23	Accelerator pedal position (APP) sensor – plausibility	Wiring short to earth/open circuit/short to positive, APP sensor, ECM
24	Vehicle speed sensor (VSS) – plausibility	Wiring short to earth/open circuit/short to positive, supply voltage, VSS, ECM
27	Mass air flow (MAF) sensor – low voltage	Wiring short to earth/open circuit, supply voltage, earth connection, MAF sensor, ECM

**ROVER**

Model: 200/400/600 2.0 TD

**Engine management**

Flash type	Fault location	Probable cause
28	Mass air flow (MAF) sensor – high voltage	Wiring short to earth/open circuit/short to positive, earth connection, MAF sensor, ECM
29	Mass air flow (MAF) sensor – plausibility	Wiring short to earth/open circuit/short to positive, supply voltage, earth connection, MAF sensor, intake leak, ECM
31	Crankshaft position (CKP) sensor – no signal	Wiring short to earth/open circuit, CKP sensor, ECM
33	Exhaust gas recirculation (EGR) system	Hoses blocked/leaking, wiring short to earth/open circuit, EGR solenoid, EGR valve, vacuum pump, MAF sensor/wiring, ECM
34	Fuel injection timing solenoid	Wiring open circuit, supply voltage, fuel injection timing solenoid, ECM
37	Brake pedal position (BPP) switch – plausibility	Fuse, wiring open circuit/short to positive, supply voltage, BPP switch, ECM
39	Alarm system	Alarm system defective
41	Manifold absolute pressure (MAP) sensor – low voltage	Wiring short to earth/open circuit, MAP sensor, ECM
42	Manifold absolute pressure (MAP) sensor – high voltage	Wiring open circuit/short to positive, MAP sensor, ECM
43	Manifold absolute pressure (MAP) sensor – plausibility	Wiring short to earth/open circuit/short to positive, supply voltage, MAP sensor, ECM
48	Battery – low voltage	Earth connection, battery, alternator
54	Fuel shut-off solenoid – defective	Wiring short to positive, fuel shut-off solenoid
55	Engine control module (ECM)	Wiring, supply voltage, earth connection, ECM
61	Fuel quantity adjuster position sensor – high/low voltage	Wiring short to earth/open circuit/short to positive, fuel quantity adjuster position sensor, ECM
62	Fuel quantity adjuster position sensor – plausibility	Wiring open circuit, fuel quantity adjuster position sensor, ECM
64	Fuel quantity adjuster	Wiring short to earth/open circuit, fuel quantity adjuster position sensor, ECM
71	Intake air temperature (IAT) sensor – low voltage	Wiring short to earth/open circuit, IAT sensor, ECM
72	Intake air temperature (IAT) sensor – high voltage	Wiring open circuit/short to positive, IAT sensor, ECM
81	Injector needle lift sensor – no signal	Wiring short to earth/open circuit/short to positive, injector needle lift sensor, ECM
82	Injector needle lift sensor – plausibility	Wiring short to earth/open circuit/short to positive, injector needle lift sensor, CKP sensor, ECM





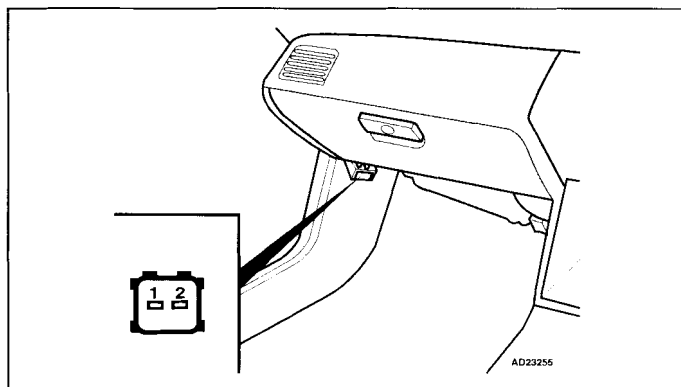
Model: 600 1,8/2,0/2,3  
 Year: 1993-99  
 Engine code: F18A3, F20Z2, F20Z1, H23A3  
 System: Honda PGM-FI

**ROVER**



Engine management

## Data link connector (DLC) locations



## Trouble codes

### General information

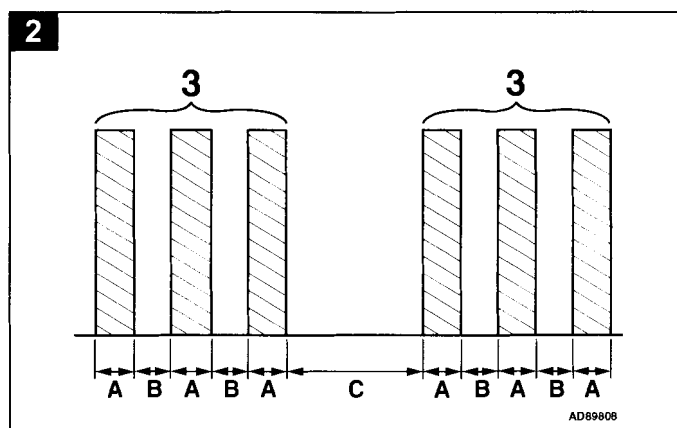
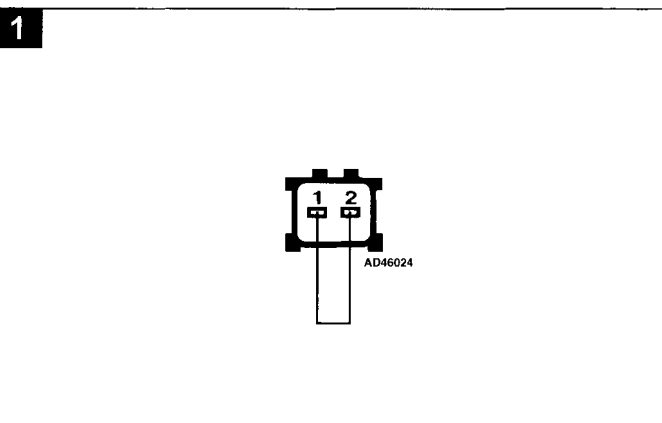
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- Switch ignition ON. If MIL illuminates to indicate a fault but no trouble codes are stored, suspect DLC/MIL wiring, MIL or ECM.
- If a trouble code is displayed but not listed in the trouble code table, suspect engine control module (ECM) fault.

### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals **1**.
- Switch ignition ON.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.

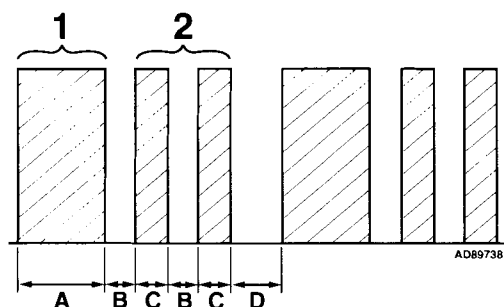
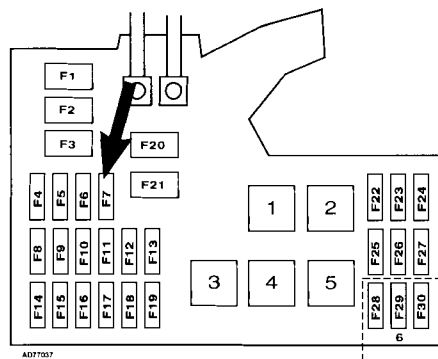
**NOTE: No trouble codes stored if MIL illuminates continuously.**

- Trouble codes 1-9 are indicated as follows:
  - Individual short flashes display trouble code **2** [A].
  - A short pause separates each flash **2** [B].
  - A long pause separates each trouble code **2** [C].
  - For example: Trouble code 3 displayed **2**.
- Trouble codes greater than 9 are indicated as follows:
  - Long flashes indicate the 'tens' of the trouble code **3** [A].
  - Short flashes indicate the 'units' of the trouble code **3** [C].
  - A short pause separates each flash **3** [B].
  - A long pause separates each trouble code **3** [D].
  - For example: Trouble code 12 displayed **3**.
- Switch ignition OFF.
- Remove bridge wire.



**ROVER**

Model: 600 1,8/2,0/2,3

**Engine management****3****4****Erasing**

- Ensure ignition switched OFF.
- Remove fuse F7 (7,5A) from underbonnet fusebox (ECM and radio memory) **4**.
- Wait 10 seconds.
- Refit fuse.

**Trouble code identification**

Flash type	Fault location	Probable cause
1	Heated oxygen sensor (HO2S)	Fuel pressure/pump, wiring short to earth/open circuit/short to positive, HO2S, ECM
3	Manifold absolute pressure (MAP) sensor – circuit	Wiring short to earth/open circuit/short to positive, supply voltage, MAP sensor, ECM
4	Engine speed (RPM) sensor	RPM sensor, wiring short to earth/open circuit, ECM
5	Manifold absolute pressure (MAP) sensor – signal	Intake leak, MAP sensor, wiring, ECM
6	Engine coolant temperature (ECT) sensor	Wiring short to earth/open circuit, ECT sensor, ECM
7	Throttle position (TP) sensor	Wiring short to earth/open circuit, TP sensor, ECM
8	Crankshaft position (CKP) sensor	CKP sensor, wiring short to earth/open circuit, ECM
9	Camshaft position (CMP) sensor	CMP sensor, wiring short to earth/open circuit, ECM
10	Intake air temperature (IAT) sensor	Wiring short to earth/open circuit, IAT sensor, ECM
12	Exhaust gas recirculation (EGR) solenoid	Wiring short to earth/open circuit, EGR solenoid, ECM
13	Barometric pressure (BARO) sensor – circuit	Wiring short to earth/open circuit/short to positive, supply voltage, BARO sensor, ECM
14	Idle air control (IAC) valve	Wiring short to earth/open circuit/short to positive, IAC valve
15	Ignition amplifier – control circuit	Wiring short to earth/open circuit/short to positive, supply voltage, ignition amplifier, ECM
16	Injectors	Wiring short to earth/open circuit/short to positive, supply voltage, injector series resistor, injector, ECM
17	Vehicle speed sensor (VSS)	Speedometer/cable, wiring short to earth/open circuit, VSS

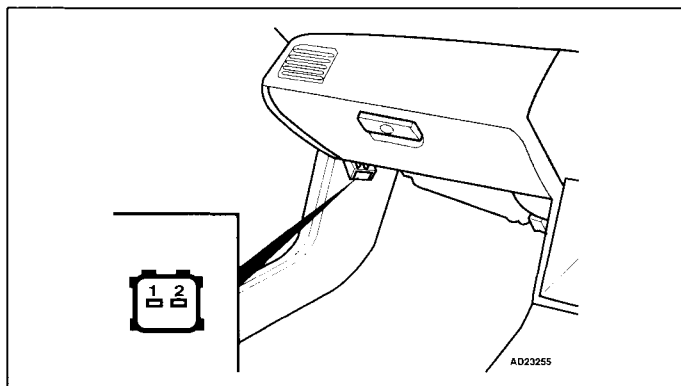


Flash type	Fault location	Probable cause
30	ECM/transmission control module (TCM), AT – signal A	Wiring short to earth/open circuit, ECM
31	ECM/transmission control module (TCM), AT – signal B	Wiring short to earth/open circuit, ECM
41	Heated oxygen sensor (HO2S) – heater circuit	Wiring short to earth/open circuit, HO2S, ECM
43	Fuel system	Fuel pressure/pump, injector(s), injector resistor, fuel contamination, engine control relay, HO2S, wiring short to earth/open circuit/short to positive, supply voltage, ECM



**ROVER**

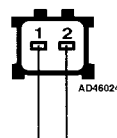
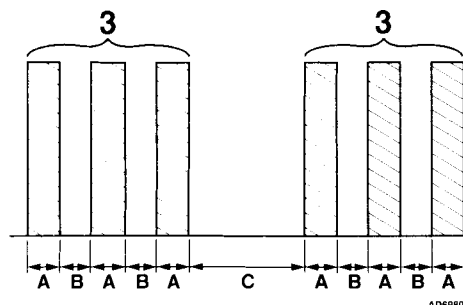
Model: 600 2,0/2,3  
 Year: 1993-99

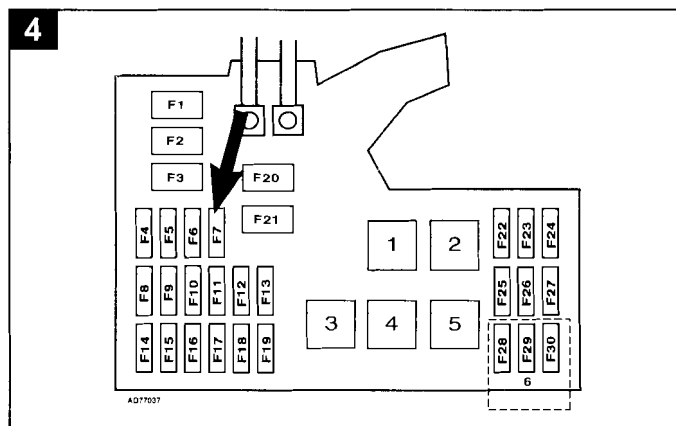
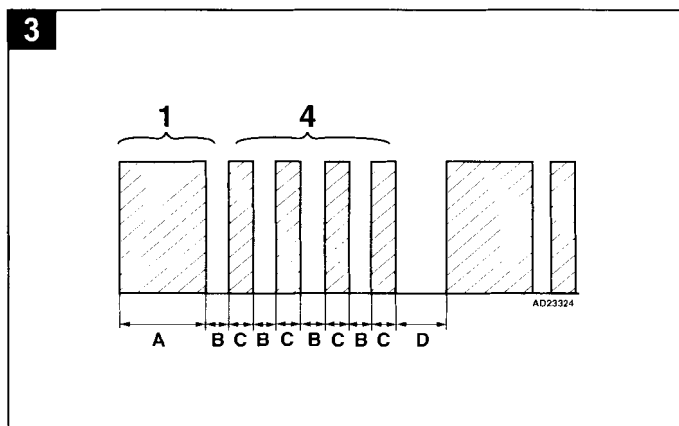
**Transmission****Data link connector (DLC) locations****Under fascia, LH****Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the transmission warning lamp.
- If a trouble code is displayed but not listed in the trouble code table, suspect transmission control module (TCM) fault.
- Transmission warning lamp should illuminate for 2 seconds after the ignition is switched ON.

**Accessing**

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals **1**.
- Switch ignition ON.
- Count transmission warning lamp flashes. Note trouble codes. Compare with trouble code table.
- Trouble codes 1-9 are indicated as follows:
  - Individual short flashes display trouble code **2** [A].
  - A short pause separates each flash **2** [B].
  - A long pause separates each trouble code **2** [C].
  - For example: Trouble code 3 displayed **2**.
- Trouble codes greater than 9 are indicated as follows:
  - Long flashes indicate the 'tens' of the trouble code **3** [A].
  - Short flashes indicate the 'units' of the trouble code **3** [C].
  - A short pause separates each flash **3** [B].
  - A long pause separates each trouble code **3** [D].
  - For example: Trouble code 14 displayed **3**.
- Switch ignition OFF.
- Remove bridge wire.

**1****2**

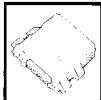


### Erasing

- Ensure ignition switched OFF.
- Remove fuse F7 (7,5A) from underbonnet fusebox (ECM and radio memory) **4**.
- Wait 10 seconds.
- Refit fuse.

### Trouble code identification

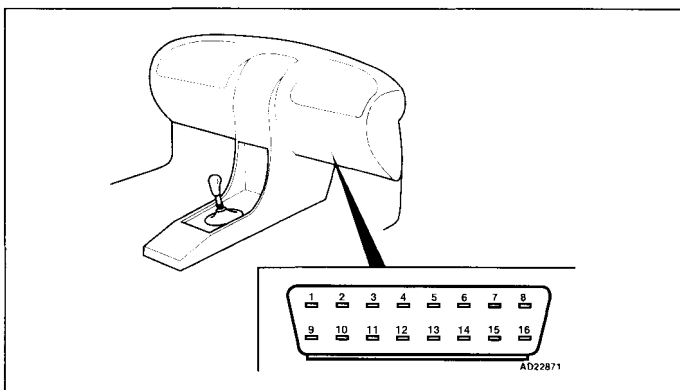
Flash type	Fault location	Probable cause
1	Torque converter clutch (TCC) lock-up solenoid A	Wiring short to earth/open circuit/short to positive, TCC lock-up solenoid, TCM
2	Torque converter clutch (TCC) lock-up solenoid B	Wiring short to earth/open circuit/short to positive, TCC lock-up solenoid, TCM
3	Throttle position (TP) sensor	Wiring short circuit/open circuit, TP sensor, TCM
4	Vehicle speed sensor (VSS)	Wiring short circuit/open circuit, VSS, TCM
5	Transmission range (TR) switch	Wiring short circuit/short to earth, TR switch, TCM
6	Transmission range (TR) switch	Wiring open circuit, TR switch, TCM
9	Transmission intermediate shaft speed sensor	Wiring short circuit/open circuit, transmission intermediate shaft speed sensor, TCM
10	Engine coolant temperature (ECT) sensor	Wiring short circuit/open circuit, ECT sensor, TCM
11	Ignition coil	Wiring short to earth/open circuit, ignition coil
14	Engine control module (ECM)/transmission control module (TCM) – communication	Wiring short to earth/open circuit, TCM, ECM
15	Input shaft speed (ISS) sensor	Wiring short circuit/open circuit, ISS sensor

**SAAB**

Model: 900 2,0/2,3/2,5 • 9-3 2,0/2,3  
Year: 1993-00  
Engine code: B204I, B206I, B234I, B258I  
System: Bosch Motronic 2.8.1 • Bosch Motronic 2.10.2/3  
Trouble codes: Flash type

## Engine management

### Data link connector (DLC) locations



Under steering column

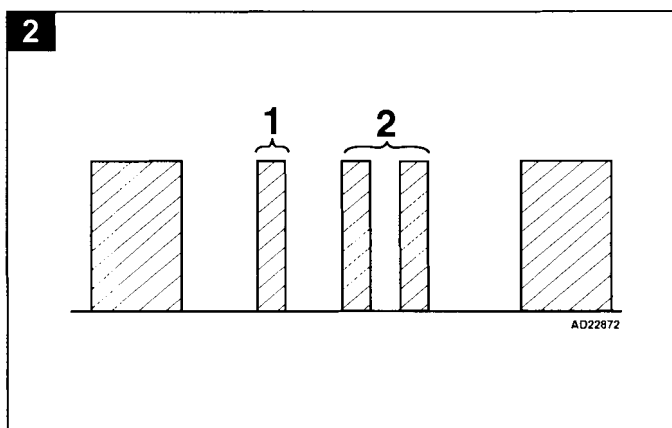
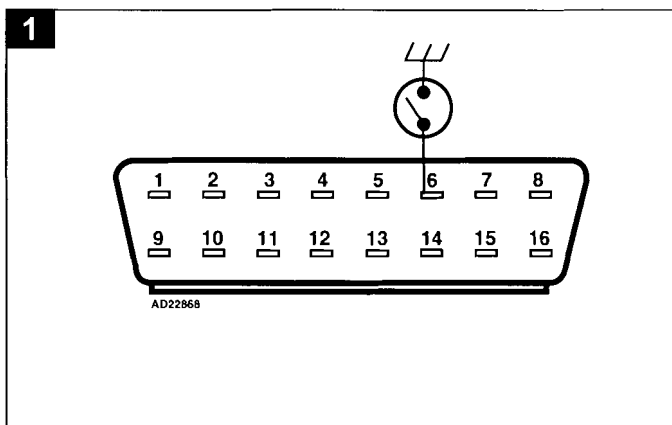
### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- More detailed fault diagnosis information can be obtained using diagnostic equipment connected to the data link connector (DLC).

#### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminal 6 and earth with a switched lead – contacts normally open **1**.
- Switch ignition ON.
- Set switch to ON for 4 seconds max. **1**.
- Trouble codes are displayed as a two digit number with a long flash between each separate code.
- For example: Trouble code 12 displayed – no fault found **2**.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.



#### Erasing

- Diagnostic equipment required to erase data from ECM fault memory.

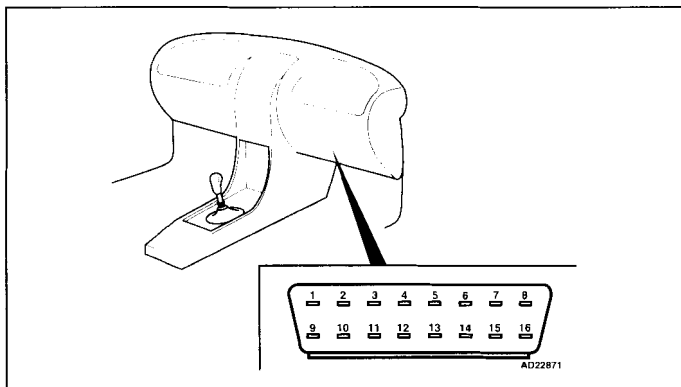
**Trouble code identification**

Flash type	Fault location	Probable cause
11	Secondary air injection (AIR) pump relay, short to earth/positive	Wiring, relay
12	No fault found	–
21	Mass air flow (MAF) sensor, short to earth/positive	Wiring, MAF sensor
31	Intake air temperature (IAT) sensor	Wiring, IAT sensor
41	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
51	Throttle position (TP) sensor	Wiring, TP sensor
61	Heated oxygen sensor (HO2S)	Wiring, HO2S, intake/fuel leak, fuel pressure
61	Heated oxygen sensor (HO2S) 2	Wiring, HO2S, intake/fuel leak, fuel pressure
62	Heated oxygen sensor (HO2S) 1	Wiring, HO2S, intake/fuel leak, fuel pressure
71	Mixture rich/lean, cylinder 1-3-5	Heated oxygen sensor (HO2S), intake leak, injector(s), fuel pressure
72	Mixture rich/lean, cylinder 2-4-6	Heated oxygen sensor (HO2S), intake leak, injector(s), fuel pressure
72 <b>1</b>	Mixture rich/lean – long time	Wiring, heated oxygen sensor (HO2S), intake leak, exhaust leak, injector(s), fuel pressure
73	Mixture rich/lean – short time	Wiring, heated oxygen sensor (HO2S), intake leak, exhaust leak, injector(s), fuel pressure
81	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve
91	Engine control module (ECM) – RAM error	ECM
92	Engine control module (ECM) – ROM error	ECM

**1** Motronic 2.10.3

**SAAB**

Model: 900 2,0/2,3/2,5 • 9-3 2,0/2,3  
 Year: 1993-00  
 Engine code: B204I, B206I, B234I, B258I  
 System: Bosch Motronic 2.8.1 • Bosch Motronic 2.10.2/3  
 Trouble codes: EOBD type

**Engine management****Data link connector (DLC) locations**

Under steering column

**Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.




**Accessing and erasing**

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification**

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1001	Evaporative emission (EVAP) canister purge valve – low output	Wiring open circuit/short to earth, EVAP canister purge valve
P1002	Evaporative emission (EVAP) canister purge valve – high output	Wiring short to positive, EVAP canister purge valve
P1011	Injector 1 – low output	Wiring open circuit/short to earth, injector
P1012	Injector 1 – high output	Wiring short to positive, injector
P1021	Injector 2 – low output	Wiring open circuit/short to earth, injector
P1022	Injector 2 – high output	Wiring short to positive, injector
P1031	Injector 3 – low output	Wiring open circuit/short to earth, injector
P1032	Injector 3 – high output	Wiring short to positive, injector
P1041	Injector 4 – low output	Wiring open circuit/short to earth, injector



<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1042	Injector 4 – high output	Wiring short to positive, injector
P1051	Injector 5 – low output	Wiring open circuit/short to earth, injector
P1052	Injector 5 – high output	Wiring short to positive, injector
P1061	Injector 6 – low output	Wiring open circuit/short to earth, injector
P1062	Injector 6 – high output	Wiring short to positive, injector
P1171 	Intake manifold air control solenoid, outer flap – short to earth	Wiring, intake manifold air control solenoid
P1172	System too lean, during idling	Intake leak, battery
P1172 	Intake manifold air control solenoid, outer flap – short to positive	Wiring, intake manifold air control solenoid
P1173	System too rich, during idling	Fuel pressure, battery, exhaust leak, injector(s)
P1206	Secondary air injection (AIR) pump relay – low output	Wiring open circuit/short to earth, secondary air injection (AIR) pump, relay
P1207	Secondary air injection (AIR) pump relay – high output	Wiring short to positive, secondary air injection (AIR) pump, relay
P1211	Idle air control (IAC) valve – low output	Wiring open circuit/short to earth, IAC valve
P1212	Idle air control (IAC) valve – high output	Wiring short to positive, IAC valve
P1251	Malfunction indicator lamp (MIL) – low output	Wiring short to earth
P1252	Malfunction indicator lamp (MIL) – high output	Wiring short to positive
P1300	Engine control module (ECM) – AT torque reduction signal	Wiring, transmission control module (TCM)
P1301	Engine control module (ECM) – AT torque reduction signal	Wiring, transmission control module (TCM)
P1455	AC compressor clutch relay – low output	Wiring open circuit/short to earth, relay
P1456	AC compressor clutch relay – high output	Wiring short to positive, relay
P1500	Battery voltage – too low/high	Wiring, alternator, battery
P1560	Traction control module/ECM communication – signal low	Wiring open circuit/short to earth, throttle position (TP) sensor
P1561	Traction control module/ECM communication – signal high	Wiring short to positive, throttle position (TP) sensor
P1601	Fuel pump relay – high output	Wiring short to positive, relay
P1602	Fuel pump relay – low output	Wiring open circuit/short to earth, relay
P1621	AC compressor clutch relay – high output	Wiring short to positive, AC compressor clutch relay
P1622	AC compressor clutch relay – low output	Wiring open circuit/short to earth, AC compressor clutch relay
P1628	Battery voltage – too low/high	Wiring, alternator, battery
P1628 	Engine control module (ECM) – supply voltage missing	Wiring, connector, fuse
P1630	AC compressor clutch relay – high output	Wiring short to positive, relay
P1631	AC compressor clutch relay – low output	Wiring open circuit/short to earth, relay

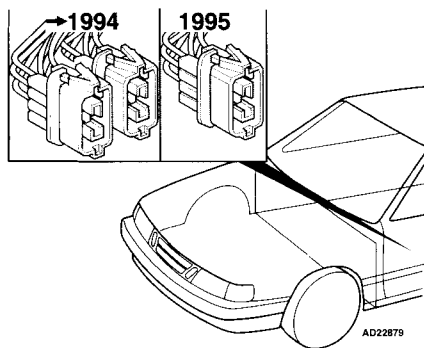
**SAAB**

Model: 900 2,0 Turbo • 9000 2,0/2,3/Turbo (94 →)  
 9000 2,3 Aero (94 →)

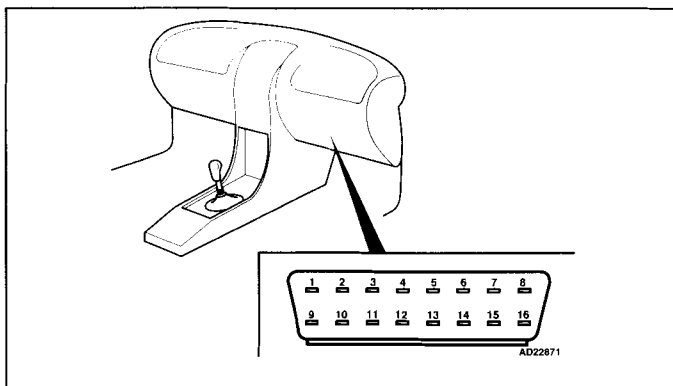
Year: 1993-98

Engine code: B204E, B204I, B204L, B204S, B234, B234E, B234I,  
 B234L, B234R

System: Tronic

**Engine management****Data link connector (DLC) locations**

→1994 black DLC/9000 →1995 – under LH front seat



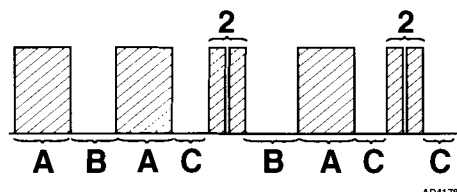
16-pin – under steering column

**Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).

**Accessing – flash type**

- Ensure ignition switched OFF.
- Switch ignition ON – DO NOT start engine.
- MIL will illuminate for 3 seconds **1** [A].
- MIL will extinguish for 3 seconds **1** [B].
- MIL will illuminate for 3 seconds **1** [A].
- MIL will extinguish for 2 seconds **1** [C].
- The last MIL ON/OFF indicates start of trouble code display.
- Trouble codes are displayed as a single digit number with a 3 second interval between each separate code.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- For example: Trouble code 2 displayed – manifold absolute pressure (MAP) sensor **1**.
- After the last trouble code has been displayed, MIL extinguishes for 3 seconds **1** [B].
- MIL illuminates for 3 seconds **1** [A].
- MIL will now repeat all recorded trouble codes.
- Switch ignition OFF.

**1****Erasing – flash type**

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug or battery earth lead for at least 5 minutes.

**NOTE:** ECM adaptive memory may be erased causing erratic running faults. Carry out road test to allow ECM to re-learn basic values.

- Diagnostic equipment can also be used to erase data from ECM fault memory.

**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).

**Trouble code identification**

Flash type	Fault location	Probable cause
2	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor
3	Intake air temperature (IAT) sensor	Wiring, IAT sensor
4	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
5	Throttle position (TP) sensor	Wiring, TP sensor
6	Heated oxygen sensor (HO2S)	Wiring, intake/fuel leak, fuel pressure, HO2S
7	Mixture rich/lean	Heated oxygen sensor (HO2S), intake leak, injector (s), fuel pressure, MAP sensor
8	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve
9	Engine control module (ECM) – internal fault	ECM

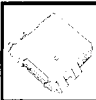
**Accessing and erasing – EOBD type**

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification**

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1130	Heated oxygen sensor (HO2S) 1, bank 1 – heater high input	Wiring, fuses, HO2S
P1135	Heated oxygen sensor (HO2S) 1, bank 1 – heater low input	Wiring, fuses, HO2S
P1322	Electronic throttle system (ETS) – incorrect rpm signal	Wiring, engine control module (ECM)/ETS control module communication
P1443	Evaporative emission (EVAP) canister purge valve – malfunction	Wiring, connectors, EVAP canister purge valve
P1444	Evaporative emission (EVAP) canister purge valve – high input	Wiring, connectors, EVAP canister purge valve
P1445	Evaporative emission (EVAP) canister purge valve – low input	Wiring, connectors, EVAP canister purge valve
P1500	Battery voltage – too low/high	Wiring, alternator, battery
P1651	Engine control module (ECM) – RAM error	ECM
P1652	Engine control module (ECM) – ROM error	ECM

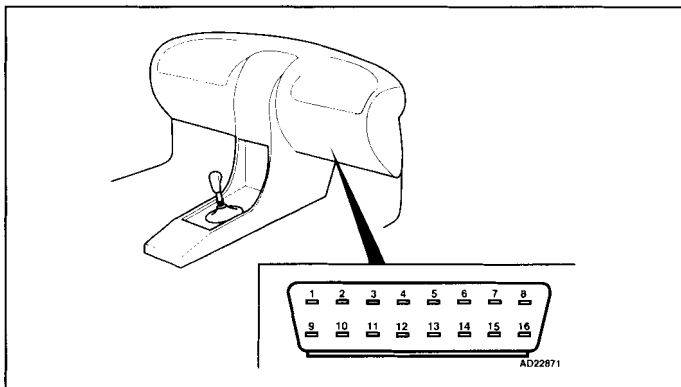


**SAAB**

Model: 9-3 2,0 Turbo • 9-3 2,3 Viggen • 9-5 2,0/2,3 Turbo  
9-5 2,3 Aero/3,0  
Year: 1997-04  
Engine code: B204E, B204L, B204R, B205E, B205F, B205L,  
B205R, B235E, B235R, B308E,  
System: Trionic T7 • Trionic T5

## Engine management

### Data link connector (DLC) locations



Under steering column

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification




EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1105	Manifold absolute pressure (MAP) sensor, TC system – leak detected	Intake leak, hose(s)
P1106	Manifold absolute pressure (MAP) sensor, TC system – range/performance problem	MAP sensor – TC system
P1107	Manifold absolute pressure (MAP) sensor, TC system – open circuit/short to earth	Wiring open circuit/short to earth, ECM
P1108	Manifold absolute pressure (MAP) sensor, TC system – short to positive	Wiring short to positive, ECM
P1110	Turbocharger (TC) bypass valve – range/performance problem	Hose(s), TC bypass solenoid, TC bypass valve
P1131	Heated oxygen sensor (HO2S) 1, bank 1 – malfunction	Wiring, HO2S, ECM
P1132	Heated oxygen sensor (HO2S) 1, bank 1 – malfunction	Wiring, HO2S, ECM

EOBD type	Fault location	Probable cause
P1133	Heated oxygen sensor (HO2S) 1, bank 1 – voltage low	Wiring, HO2S
P1135	Heated oxygen sensor (HO2S) 1, bank 1 – heater low input	Wiring, fuel pump relay, HO2S, ECM
P1136	Heated oxygen sensor (HO2S) 1, bank 1 – heater high input	Wiring, fuel pump relay, HO2S, ECM
P1137	Heated oxygen sensor (HO2S) 2, bank 1 – voltage low	Wiring, HO2S
P1141	Heated oxygen sensor (HO2S) 2, bank 1 – heater low input	Wiring, fuel pump relay, HO2S, ECM
P1142	Heated oxygen sensor (HO2S) 2, bank 1 – heater high input	Wiring, fuel pump relay, HO2S, ECM
P1171	Short term fuel trim (FT), max. value – weak mixture	Fuel pressure, injector(s), intake system, mass air flow (MAF) sensor
P1172	Short term fuel trim (FT), min. value – rich mixture	Fuel pressure, injector(s), evaporative emission (EVAP) canister purge valve
P1181	Long term fuel trim (FT), max. value – weak mixture	Fuel pressure, injector(s), intake system, mass air flow (MAF) sensor
P1182	Long term fuel trim (FT), min. value – rich mixture	Fuel pressure, injector(s), evaporative emission (EVAP) canister purge valve
P1230	Throttle position (TP) sensor 1 & 2 – range/performance problem	Wiring, connectors, throttle control unit, ECM
P1240	Throttle position motor – short circuit	Wiring, throttle control unit, ECM
P1251	Throttle position motor – fully closed signal	Wiring, mechanical fault, throttle control unit, ECM
P1252	Throttle position motor – fully open signal/no current	Wiring, throttle control unit, ECM
P1253	Throttle position motor – fully open signal during cranking	Wiring, mechanical fault, throttle control unit, ECM
P1260	Throttle return spring – weak spring force	Mechanical fault, throttle control unit
P1261	Throttle valve – tight/sticking	Mechanical fault, throttle control unit, ECM
P1263	Throttle valve – moved manually while engine running	Throttle control unit, mechanical fault
P1264	Throttle valve open – accelerator depressed	Throttle control unit, mechanical fault
P1300	Random/multiple cylinder(s) – misfire detected	Mechanical fault, wiring, ignition/fuel system, mass air flow (MAF) sensor, fuel pump relay, manifold absolute pressure (MAP) sensor, intake leak
P1301	Cylinder 1 – misfire detected	Mechanical fault, ignition/fuel system, injector
P1302	Cylinder 2 – misfire detected	Mechanical fault, ignition/fuel system, injector
P1303	Cylinder 3 – misfire detected	Mechanical fault, ignition/fuel system, injector
P1304	Cylinder 4 – misfire detected	Mechanical fault, ignition/fuel system, injector
P1310	Ignition coils, bank 1 – no supply voltage	Wiring, ignition coil assembly, ECM
P1312	Ignition coil – knock detection, cylinder 1 & 2	Wiring open circuit/short to positive, ignition coil assembly, ECM
P1320	Ignition coils, bank 2 – no supply voltage	Wiring, ignition coil assembly, ECM
P1334	Ignition coil – knock detection, cylinder 3 & 4	Wiring open circuit/short to positive, ignition coil assembly, ECM
P1390	Misfire detected, random – fuel level low	Wiring, connectors, injector(s), fuel pump relay, fuel pressure, mass air flow (MAF) sensor, intake leak, fuel level
P1391	Cylinder 1, misfire detected – fuel level low	Wiring, connectors, injector, fuel level



**SAAB**Model: 9-3 2,0 Turbo • 9-3 2,3 Viggen • 9-5 2,0/2,3 Turbo  
9-5 2,3 Aero/3,0**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1392	Cylinder 2, misfire detected – fuel level low	Wiring, connectors, injector, fuel level
P1393	Cylinder 3, misfire detected – fuel level low	Wiring, connectors, injector, fuel level
P1394	Cylinder 4, misfire detected – fuel level low	Wiring, connectors, injector, fuel level
P1395	Cylinder 5, misfire detected – fuel level low	Wiring, connectors, injector, fuel level
P1396	Cylinder 6, misfire detected – fuel level low	Wiring, connectors, injector, fuel level
P1413	Secondary air injection (AIR) pump relay – open circuit/short to earth	Wiring open circuit/short to earth, AIR pump relay
P1414	Secondary air injection (AIR) pump relay – short to positive	Wiring short to positive, AIR pump relay
P1416	Fuel system/misfire detected – fuel level low	Ignition/fuel system, injector(s), fuel level
P1441	Evaporative emission (EVAP) canister purge valve/fuel tank level sensor – malfunction	Wiring, connectors, EVAP canister purge valve, fuel tank level sensor, ECM
P1442	Evaporative emission (EVAP) system/fuel tank level sensor – small leak detected/malfunction	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve, wiring, fuel tank level sensor
P1444	Evaporative emission (EVAP) system – open circuit/short to earth	Wiring open circuit/short to earth, connectors, EVAP canister purge valve
P1445	Evaporative emission (EVAP) system – open circuit/short to positive	Wiring open circuit/short to positive, connectors, EVAP canister purge valve
P1451	Evaporative emission (EVAP) pressure sensor, in fuel tank – range/performance problem	Wiring, connectors, EVAP pressure sensor
P1452	Evaporative emission (EVAP) pressure sensor, in fuel tank – signal too low when depressurised	Wiring, EVAP canister purge valve, EVAP system leak, EVAP pressure sensor
P1453	Evaporative emission (EVAP) pressure sensor, in fuel tank – signal too high when depressurised	Wiring, EVAP canister purge valve, hose(s), EVAP pressure sensor
P1455	Evaporative emission (EVAP) pressure sensor/fuel tank level sensor, in fuel tank – large leak detected/malfunction	Hose connection(s), wiring, EVAP pressure sensor, fuel tank level sensor
P1460	Immobilizer activated – incorrectly programmed/not programmed	Trouble code(s) stored in other system(s), ECM/instrumentation control module/ignition key not matched to immobilizer control module, immobilizer control module
P1491	Evaporative emission (EVAP) pressure sensor/fuel tank level sensor, in fuel tank – range/performance problem/malfunction	Wiring, connector(s), EVAP pressure sensor, fuel tank level sensor
P1492	Evaporative emission (EVAP) pressure sensor/fuel tank level sensor, in fuel tank – signal too low when depressurised/malfunction	Wiring, connector(s), EVAP pressure sensor, fuel tank level sensor
P1493	Evaporative emission (EVAP) pressure sensor/fuel tank level sensor, in fuel tank – signal too high when depressurised/malfunction	Wiring, connector(s), EVAP pressure sensor, fuel tank level sensor
P1500	Battery voltage – too low/high	Wiring, alternator, battery
P1530	Accelerator pedal position (APP) sensor 1 & 2 – range/performance problem	Wiring, throttle control unit, ECM
P1531	Accelerator pedal position (APP) sensor 1 & 2 – adapted value out of range	Wiring, throttle control unit, ECM
P1532	Accelerator pedal position (APP) sensor 1 & 2 – short circuit	Wiring, throttle control unit, ECM

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1549	Turbocharger (TC) system – malfunction	Mechanical fault, hose(s), TC wastegate regulating valve
P1576	Brake pedal position (BPP) switch – open circuit/short to positive	Wiring open circuit/short to positive, BPP switch
P1577	Brake pedal position (BPP) switch – short to earth	Wiring short to earth, BPP switch
P1601	Engine control module (ECM) – defective	ECM
P1602	Engine control module (ECM) – defective	ECM
P1603	Engine control module (ECM) – defective	ECM
P1604	Engine control module (ECM) – defective	ECM
P1605	Engine control module (ECM) – defective	ECM
P1606	Engine control module (ECM) – defective	ECM
P1607	Engine control module (ECM) – defective	ECM
P1608	Engine control module (ECM) – defective	ECM
P1609	Engine control module (ECM) – defective	ECM
P1610	Engine control module (ECM) – defective	ECM
P1611	Engine control module (ECM) – defective	ECM
P1611 	Malfunction indicator lamp (MIL) – short to earth	Wiring short to earth, TCM trouble code(s) stored
P1613	Engine control module (ECM) – defective	ECM
P1614	Engine control module (ECM) – defective	ECM
P1621	Engine control module (ECM) – defective	ECM
P1623	CAN data bus, TCM	Wiring
P1624	CAN data bus, TCM	TCM trouble code(s) stored
P1625	CAN data bus, TCS/ABS	Wiring
P1631	Engine control module (ECM) – defective	ECM
P1632	Engine control module (ECM) – defective	ECM
P1633	Engine control module (ECM) – defective	ECM
P1640	Engine control relay – no voltage to ECM pin 1	Wiring, connectors, engine control relay
P1640 	Immobilizer code – not programmed	Code must be programmed into multifunction control module 2 after replacing ECM, instrument panel, multifunction control module 2
P1641	Fuel pump relay – no voltage to fuel pump/oxygen sensor heater	Wiring, connectors, fuel pump relay
P1641 	Immobilizer code – incorrect	Multifunction control module 2 incorrectly coded
P1652	Engine control relay – open circuit/short to earth	Wiring open circuit/short to earth, connectors, engine control relay, ECM
P1653	Engine control relay – short to positive	Wiring short to positive, connectors, engine control relay, ECM
P1654	Fuel pump relay – open circuit/short to earth	Wiring open circuit/short to earth, connectors, fuel pump relay
P1655	Fuel pump relay – short to positive	Wiring short to positive, connectors, fuel pump relay
P1656	AC relay – open circuit/short to earth	Wiring open circuit/short to earth, connectors, AC relay
P1657	AC relay – short to positive	Wiring short to positive, connectors, AC relay

**SAAB**Model: 9-3 2,0 Turbo • 9-3 2,3 Viggen • 9-5 2,0/2,3 Turbo  
9-5 2,3 Aero/3,0**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1658	Turbocharger (TC) bypass valve – open circuit/short to earth	Wiring open circuit/short to earth, connectors, TC bypass valve
P1659	Turbocharger (TC) bypass valve – short to positive	Wiring short to positive, connectors, TC bypass valve
P1662	Turbocharger (TC) wastegate regulating valve – open circuit/short to earth	Wiring open circuit/short to earth, connectors, TC wastegate regulating valve
P1663	Turbocharger (TC) wastegate regulating valve – short to positive	Wiring short to positive, connectors, TC wastegate regulating valve
P1670	Throttle actuator limp home relay – open circuit/short to earth	Wiring open circuit/short to earth, connectors, throttle actuator limp home relay
P1671	Throttle actuator limp home relay – short to positive	Wiring short to positive, connectors, throttle actuator limp home relay
P1676	Injector circuits – open circuit/short to earth/positive	Wiring, fuse, injector(s), ECM
P1901 <sup>2</sup>	CAN data bus, multifunction control module 1	Wiring
P1902 <sup>3</sup>	CAN data bus, multifunction control module 2	Wiring
P1908	CAN data bus, instrument panel	Wiring
P1921	CAN data bus, ECM	Wiring
P1923	CAN data bus, TCM	Wiring
P1925	CAN data bus, TCS/ABS	Wiring

<sup>1</sup> Vehicle fitted with TRIONIC T5<sup>2</sup> Multifunction control module 1 controls: headlamps, interior lamps, instrument illumination, intermittent wiper, door mirror heater, heated rear window<sup>3</sup> Multifunction control module 2 controls: central locking, alarm system, immobilizer, rear seat heater, seat belt warning, electrically adjustable passenger's seat

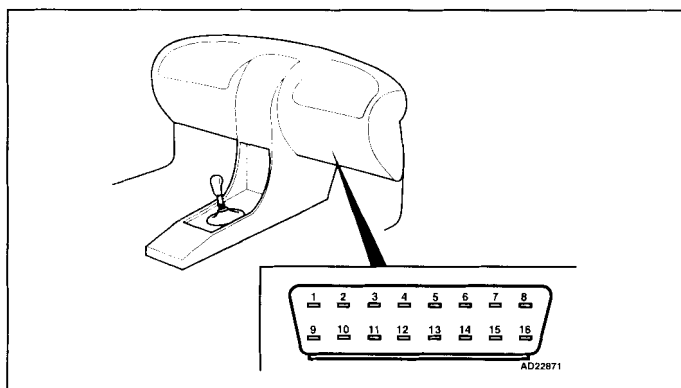


Model: 9-3 2,2D Turbo  
 Year: 1998-02  
 Engine code: D223L  
 System: Bosch EDC 15 • Bosch PSG 16

**SAAB**

Engine management

## Data link connector (DLC) locations



Under steering column

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification



P type	Fault location	Probable cause
P0100	Mass air flow (MAF) sensor – high input	Wiring, connectors, MAF sensor
P0101	Mass air flow (MAF) sensor – malfunction	Wiring, connectors, MAF sensor
P0104	Mass air flow (MAF) sensor – low input	Wiring, connectors, MAF sensor
P0106	Mass air flow (MAF) sensor – range/performance problem	Intake leak, wiring, MAF sensor
P0110	Intake air temperature (IAT) sensor – open circuit/short to positive	Wiring open circuit/short to positive, IAT sensor, ECM
P0111	Intake air temperature (IAT) sensor – short to earth	Wiring short to earth, IAT sensor, ECM
P0115	Engine coolant temperature (ECT) sensor – open circuit/short to positive	Wiring open circuit/short to positive, connector, ECT sensor
P0116	Engine coolant temperature (ECT) sensor – short to earth	Wiring short to earth, connector, ECT sensor
P0117	Engine coolant temperature (ECT) sensor – range/performance problem	Wiring, connector, ECT sensor

**SAAB**

Model: 9-3 2,2D Turbo

**Engine management**

<b>P type</b>	<b>Fault location</b>	<b>Probable cause</b>
P0120	Manifold absolute pressure (MAP) sensor – short to positive	Wiring short to positive, MAP sensor
P0121	Manifold absolute pressure (MAP) sensor – open circuit/short to earth	Wiring open circuit/short to earth, MAP sensor
P0190	Misfire detected – mechanical fault	Injector(s), fuel leak, piston(s), valve(s)
P0195	Engine oil temperature (EOT) sensor – open circuit/short to positive	Wiring open circuit/short to positive, EOT sensor
P0196	Engine oil temperature (EOT) sensor – short to earth	Wiring to earth, EOT sensor
P0400	Exhaust gas recirculation (EGR) solenoid – open circuit/short to earth	Wiring open circuit/short to earth, EGR solenoid
P0401	Exhaust gas recirculation (EGR) solenoid – short to positive	Wiring short to positive, EGR solenoid
P0402	Exhaust gas recirculation (EGR) system – excessive flow detected	Wiring, EGR valve, EGR solenoid, ECM
P0403	Exhaust gas recirculation (EGR) system – insufficient flow detected	Wiring, EGR valve, EGR solenoid, ECM
P0500	Vehicle speed sensor (VSS) – circuit malfunction	ABS trouble code(s) stored, wiring, ABS control module/engine control module (ECM) communication, ABS control module, ECM
P0606	Engine control module (ECM) – internal fault	ECM
P0703	Brake pedal position (BPP) switch/cruise control switch – plausibility	Wiring, BPP switch/cruise control switch
P0704	Clutch pedal position (CPP) switch/cruise control switch – plausibility	Wiring, CPP switch/cruise control switch
P0726	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – circuit malfunction	Wiring, CKP sensor/RPM sensor
P0727	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – mechanical fault	Wiring, CKP sensor/RPM sensor
P0728	Engine speed – too high	Wiring, throttle control system mechanical fault, fuel system, engine mechanical fault, fuel injection pump control module, ECM
P1110	Intake manifold air control solenoid – open circuit/short to earth	Wiring open circuit/short to earth, intake manifold air control solenoid
P1111	Intake manifold air control solenoid – short to positive	Wiring short to positive, intake manifold air control solenoid
P1125	Turbocharger (TC) wastegate regulating valve – open circuit/short to earth	Wiring open circuit/short to earth, connectors, TC wastegate regulating valve
P1126	Turbocharger (TC) wastegate regulating valve – short to positive	Wiring short to positive, connectors, TC wastegate regulating valve
P1127	Turbocharger (TC) boost pressure, too low – mechanical fault	Wiring, hose(s), TC wastegate regulating valve adjustment, TC wastegate regulating valve, turbocharger (TC)
P1128	Turbocharger (TC) boost pressure, too high – mechanical fault	Wiring, hose(s), TC wastegate regulating valve adjustment, TC wastegate regulating valve, turbocharger (TC)
P1173	Engine overheat protection activated – engine oil temperature	Wiring, engine oil temperature (EOT) sensor
P1174	Engine overheat protection activated – engine coolant temperature	Wiring, engine coolant temperature (ECT) sensor, engine cooling system

P type	Fault location	Probable cause
P1175	Engine overheat protection activated – fuel injection pump temperature	Wiring, fuel filter heater
P1180	Fuel temperature sensor, in injection pump – malfunction	Fuel temperature sensor, fuel injection pump control module
P1220	Injection timing control – malfunction	Fuel supply/return, injection pump, fuel injection pump control module, ECM
P1335	Fuel injection pump control module – CKP signal missing	Wiring, CKP sensor, fuel injection pump control module, ECM
P1345	Injection pump position sensor – malfunction	Wiring, injection pump position sensor, fuel injection pump control module, ECM
P1515	Accelerator pedal position (APP) sensor/ closed throttle position (CTP) switch – malfunction	Wiring, APP sensor/CTP switch
P1522	Accelerator pedal position (APP) sensor/ closed throttle position (CTP) switch – plausibility	Wiring, APP sensor/CTP switch
P1530	AC compressor clutch relay – open circuit/ short to earth	Wiring open circuit/short to earth, AC compressor clutch relay
P1531	AC compressor clutch relay – short to positive	Wiring short to positive, AC compressor clutch relay
P1604	Engine control module (ECM) – internal fault	ECM
P1605	Engine control module (ECM) – internal fault	ECM
P1606	Engine control module (ECM) – internal fault	ECM
P1607	Engine control module (ECM) – internal fault	ECM
P1608	Engine control module (ECM) – internal fault	ECM
P1610 	Immobilizer code – not programmed	Code must be programmed into multifunction control module 2 after replacing ECM, instrument panel, multifunction control module 2
P1611 	Immobilizer code – incorrect	Multifunction control module 2 incorrectly coded
P1613	CAN data bus, multifunction control module 2	Wiring, multifunction control module 2
P1614	Ignition key – incorrect signal	Ignition key not matched/damaged, poor connection, wiring
P1620	Engine control module (ECM) – internal fault	ECM
P1621	Engine control module (ECM) – internal fault	ECM
P1625	Engine control relay – no voltage to ECM pin 3	Wiring, connectors, engine control relay
P1626	Engine control relay – circuit malfunction	Wiring short to earth/positive, engine control relay
P1629	Fuel quantity adjuster – malfunction	Wiring, fuel quantity adjuster, fuel injection pump control module, ECM
P1630	Fuel quantity adjuster – short to positive	Wiring short to positive, fuel quantity adjuster, fuel injection pump control module, ECM
P1631	Fuel injection pump control module – internal fault	Fuel injection pump control module
P1632	Fuel injection pump control module – internal fault	Fuel injection pump control module
P1633	Fuel injection pump control module – internal fault	Fuel injection pump control module

**SAAB**

Model: 9-3 2,2D Turbo

**Engine management**

<b>P type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1634	Fuel injection pump control module – internal fault	Fuel injection pump control module
P1635	Fuel injection pump control module – internal fault	Fuel injection pump control module
P1636	Fuel injection pump control module – internal fault	Fuel injection pump control module
P1637	Fuel injection pump control module – internal fault	Fuel injection pump control module
P1648	CAN data bus – malfunction	Wiring
P1649	CAN data bus – malfunction	Wiring
P1650	CAN data bus, fuel injection pump control module	Wiring
P1651	CAN data bus, fuel injection pump control module	Wiring
P1652	CAN data bus – malfunction	Wiring
P1653	CAN data bus – malfunction	Wiring
P1654	CAN data bus – malfunction	Wiring
P1655	CAN data bus – malfunction	Wiring
P1656	CAN data bus – malfunction	Wiring
P1662	Fuel shut-off solenoid, in injection pump – short to positive	Wiring short to positive, fuel shut-off solenoid, fuel injection pump control module
P1663	Fuel shut-off solenoid, in injection pump – open circuit/short to earth	Wiring open circuit/short to earth, fuel shut-off solenoid, fuel injection pump control module
P1664	Fuel shut-off solenoid, in injection pump – malfunction	Wiring, fuel shut-off solenoid, fuel injection pump control module
P1670	Glow plug control module – open circuit/short to earth	Wiring open circuit/short to earth, glow plug control module
P1671	Glow plug control module – short to positive	Wiring short to positive, glow plug control module
P1672	Glow plug control module – circuit malfunction	Wiring, glow plug(s), glow plug control module/ECM communication

**1** Multifunction control module 2 controls: central locking, alarm system, immobilizer, rear seat heater, seat belt warning, electrically adjustable passenger's seat

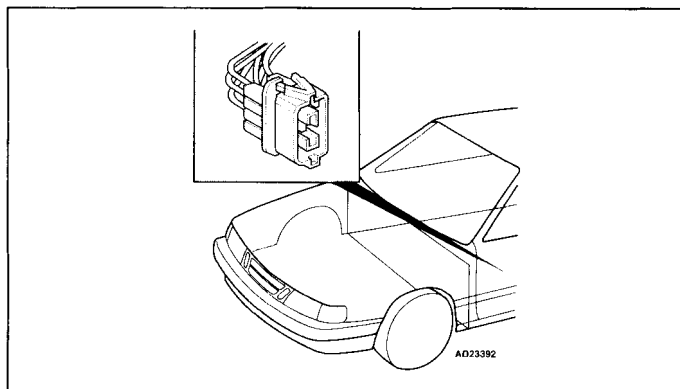


Model: 9000 3,0 V6  
 Year: 1995-97  
 Engine code: B308I  
 System: Bosch Motronic 2.8.1  
 Trouble codes: EOBD type

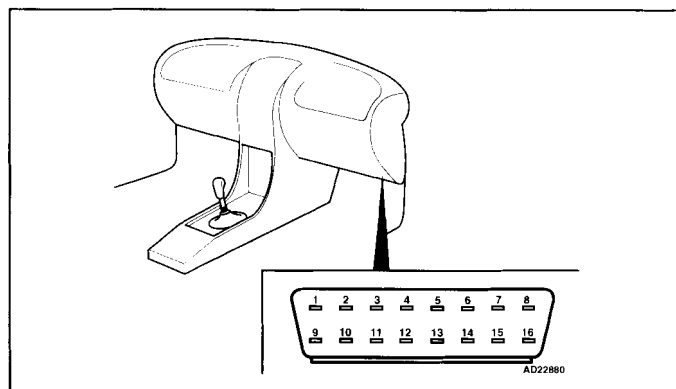
**SAAB**

## Engine management

### Data link connector (DLC) locations



1995 – under LH front seat



1996→ – under fascia, driver's side

### Trouble codes

#### General information

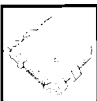
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1001	Evaporative emission (EVAP) canister purge valve – low output	Wiring open circuit/short to earth, EVAP canister purge valve
P1002	Evaporative emission (EVAP) canister purge valve – high output	Wiring short to positive, EVAP canister purge valve
P1011	Injector 1 – low output	Wiring open circuit/short to earth, injector
P1012	Injector 1 – high output	Wiring short to positive, injector
P1021	Injector 2 – low output	Wiring open circuit/short to earth, injector
P1022	Injector 2 – high output	Wiring short to positive, injector
P1031	Injector 3 – low output	Wiring open circuit/short to earth, injector
P1032	Injector 3 – high output	Wiring short to positive, injector
P1041	Injector 4 – low output	Wiring open circuit/short to earth, injector

**SAAB**

Model: 9000 3,0 V6

**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1042	Injector 4 – high output	Wiring short to positive, injector
P1051	Injector 5 – low output	Wiring open circuit/short to earth, injector
P1052	Injector 5 – high output	Wiring short to positive, injector
P1061	Injector 6 – low output	Wiring open circuit/short to earth, injector
P1062	Injector 6 – high output	Wiring short to positive, injector
P1206	Secondary air injection (AIR) pump relay – low output	Wiring open circuit/short to earth, secondary air injection (AIR) pump, relay
P1207	Secondary air injection (AIR) pump relay – high output	Wiring short to positive, secondary air injection (AIR) pump, relay
P1211	Idle air control (IAC) valve – low output	Wiring open circuit/short to earth, IAC valve
P1212	Idle air control (IAC) valve – high output	Wiring short to positive, IAC valve
P1236	Intake manifold air control solenoid, outer flap – open circuit/short to earth	Wiring, intake manifold air control solenoid
P1237	Intake manifold air control solenoid, outer flap – short to positive	Wiring, intake manifold air control solenoid
P1246	Intake manifold air control solenoid, inner flap – open circuit/short to earth	Wiring, intake manifold air control solenoid
P1247	Intake manifold air control solenoid, inner flap – short to positive	Wiring, intake manifold air control solenoid
P1251	Malfunction indicator lamp (MIL) – low output	Wiring short to earth
P1252	Malfunction indicator lamp (MIL) – high output	Wiring short to positive
P1450	AC relay – low output	Wiring, AC relay
P1451	AC relay – high output	Wiring, AC relay
P1500	Battery voltage – too low/high	Wiring, alternator, battery
P1601	Fuel pump relay – high output	Wiring short to positive, relay
P1602	Fuel pump relay – low output	Wiring open circuit/short to earth, relay
P1630	Traction control system (TCS) – signal low	Wiring open circuit/short to earth, traction control module/engine control module (ECM) communication
P1631	Traction control system (TCS) – signal high	Wiring short to positive, traction control module/engine control module (ECM) communication



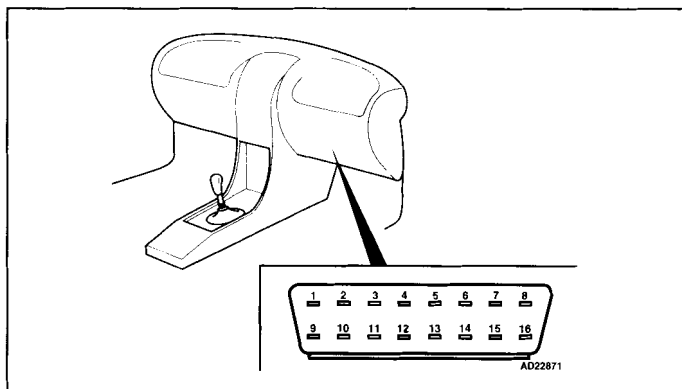
Model: 900 • 9-3 • 9-5  
Year: 1993-02

**SAAB**



Transmission

## Data link connector (DLC) locations



Under steering column

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The transmission control module (TCM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1500	Battery voltage – too low/high	Wiring, alternator, battery
P1785	Engine control module (ECM)/transmission control module (TCM) communication, throttle position signal – malfunction	Wiring
P1786	Traction control module/transmission control module (TCM) communication, throttle position signal – malfunction	Wiring
P1787	Traction control module/transmission control module (TCM) communication, throttle position signal – signal low	Wiring open circuit/short to earth
P1788	Traction control module/transmission control module (TCM) communication, throttle position signal – signal high	Wiring short to positive
P1789	Transmission control module (TCM)/engine control module (ECM) communication, transmission range (TR) signal – signal low	Wiring open circuit/short to earth
P1790	Transmission kick-down switch – low input	Wiring short to earth, transmission kick-down switch
P1812	Transmission fluid temperature (TFT) sensor – low input	Wiring short to earth, connectors, TFT sensor



**SAAB**

Model: 900 • 9-3 • 9-5

**Transmission**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1813	Transmission fluid temperature (TFT) sensor – high input	Wiring open circuit/short to positive, connectors, TFT sensor
P1817	Transmission input shaft speed sensor – no signal	Wiring, connectors, transmission input shaft speed sensor
P1822	Transmission output shaft speed sensor – no signal	Wiring, connectors, transmission output shaft speed sensor
P1830	Gear selection – shift malfunction	Automatic transmission, mechanical fault
P1831	Gear selection, down-shift – shift malfunction	Automatic transmission, mechanical fault
P1832	Gear selection, shifting-times – shift malfunction	Automatic transmission, mechanical fault
P1842	Transmission control module (TCM)/engine control module (ECM) communication, torque limitation – signal low	Wiring open circuit/short to earth, connectors
P1847	Transmission fluid pressure (TFP) control solenoid – low output	Wiring open circuit/short to earth, connectors
P1848	Transmission fluid pressure (TFP) control solenoid – high output	Wiring short to positive, connectors
P1849	Transmission fluid pressure (TFP) control solenoid – circuit malfunction	Wiring short to earth/positive, connectors, TFP control solenoid
P1852	Gear shift solenoid, 1-2/3-4 – shift malfunction	Wiring short to earth, connectors, gear shift solenoid
P1853	Gear shift solenoid, 1-2/3-4 – shift malfunction	Wiring open circuit/short to positive, connectors, gear shift solenoid
P1857	Gear shift solenoid, 2-3 – shift malfunction	Wiring short to earth, connectors, gear shift solenoid
P1858	Gear shift solenoid, 2-3 – shift malfunction	Wiring open circuit/short to positive, connectors, gear shift solenoid
P1862	Torque converter clutch (TCC) solenoid – low output	Wiring short to earth, connectors, TCC solenoid
P1863	Torque converter clutch (TCC) solenoid – high output	Wiring open circuit/short to positive, connectors, TCC solenoid
P1902 <sup>1</sup>	CAN data bus, multifunction control module 2	Wiring, connectors
P1921	CAN data bus, ECM – no signal	Wiring
P1971	CAN data bus, ECM – incorrect signal	Wiring

<sup>1</sup> Multifunction control module 2 controls: central locking, alarm system, immobilizer, rear seat heater, seat belt warning, electrically adjustable passenger's seat.





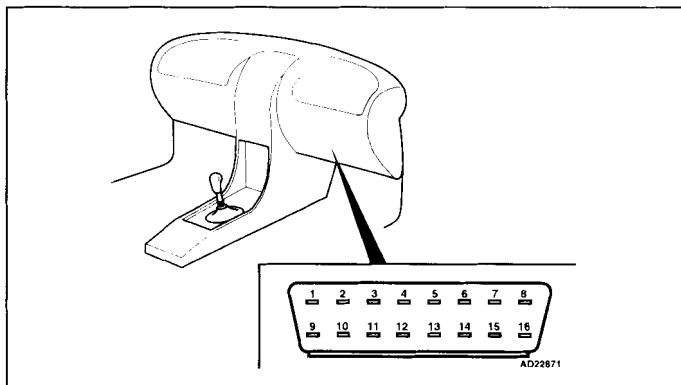
Model: 9-3 • 9-5  
Year: 1997-02

**SAAB**



Immobilizer

## Data link connector (DLC) locations



Under steering column

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The multifunction control module 2 fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**NOTE:** Multifunction control module 2 controls: central locking, alarm system, immobilizer, rear seat heater, seat belt warning, electrically adjustable passenger's seat.

### Trouble code identification

EOBD type	Fault location	Probable cause
B1130	Seat heater relay, rear – malfunction	Wiring short to positive, wiring open circuit/short to earth, connectors, relay
B1210	Seat belt warning lamp – malfunction	Wiring short to positive, wiring open circuit/short to earth, connectors, bulb
B1510	Multifunction control module 2, terminal 70 – malfunction	Earth wire, connector
B1515	Multifunction control module 2, terminal 37 – malfunction	Earth wire, connector
B1535	Seat adjustment relay – malfunction	Wiring short to positive, wiring open circuit/short to earth, relay
B1605	Multifunction control module 2 – internal fault	Multifunction control module
B1780	Engine control module (ECM) – programming	ECM not matched to immobilizer control module
B1782	Immobilizer code – not programmed/immobilizer active	Code must be programmed into multifunction control module 2 after replacing ECM, instrument panel, multifunction control module 2
B1785	Alarm system horn – open circuit/internal battery	Wiring, fuse, alarm system horn
B1790	Glass breakage sensor(s) – electrical fault	Wiring, connector, glass breakage sensor
B1795	Alarm system tilt sensor – malfunction	Wiring, sensor
B2385	Ignition key – incorrect signal	Ignition key not matched/damaged





# SEAT

**Model:** Arosa • Ibiza/Cordoba 1,0/1,4/1,6/1,8/2,0 • Ibiza/Cordoba 1,7/1,9 D/TD/SDI/TDI • Toledo 1,6/2,0 Toledo 1,9 D/TD/TDI • Toledo/Leon • Alhambra • Inca 1,4/1,6 • Inca 1,9 D/SDI

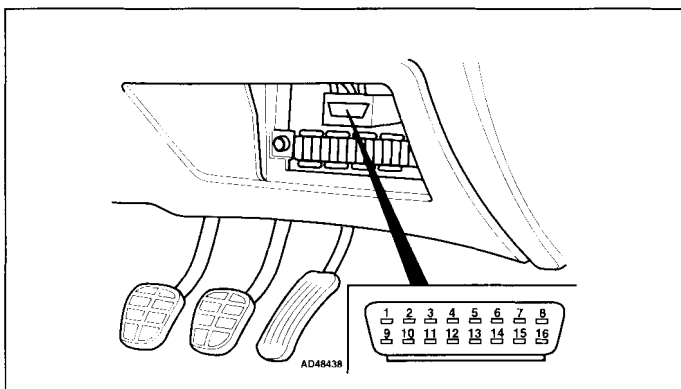
**Year:** 1993-04

**Engine code:** 1Y, 1Z, 2E, AAA, AAZ, ABF, ADL, ADY, AEE, AEH, AER, AEX, AEY, AFH, AFK, AFN, AFR, AFT, AGG, AGN, AGP, AGR, AGR, AGZ, AHB, AHF, AHT, AHU, AHW, AJH, AJM, AJQ, AKK, AKL, AKS, AKU, AKV, AKW, ALD, ALH, ALL, ALM, AMF, AMK, AMY, ANU, ANV, ANW, ANX, APE, APF, APG, APP, APQ, APT, AQM, AQN, AQQ, AQX, ARL, ARY, AST, ASV, ASZ, ATM, ATN, AUA, AUB, AUC, AUD, AUE, AUQ, AUR, AUS, AUY, AVG, AVZ, AWC, AXP, AYL, AYP, AYQ, AZD, BCA, BCB, BDE

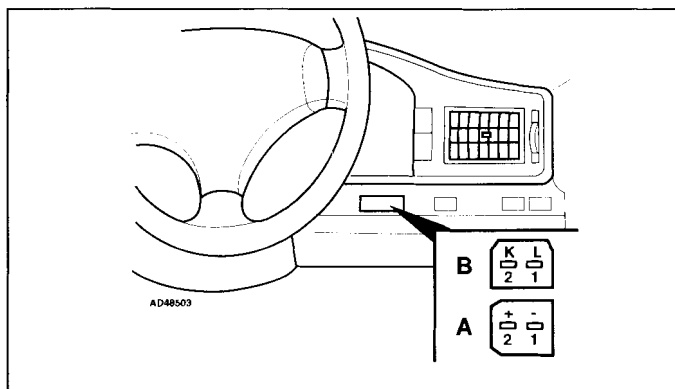
**System:** Bosch EDC/1.3.3/1.4 • Bosch EDC 15P/V • Bosch Motronic M3.8.1/2/3/5  
Bosch Motronic ME7.1/7.5/7.5.10 • Bosch Motronic MP9.0 • Bosch MSA 12/15/15.5  
Magneti-Marelli 1AV/4CV/4LV/4MV • Siemens Simos • VAG Digifant ML5.5/5.9 • VAG Digifant MP4.4

## Engine management

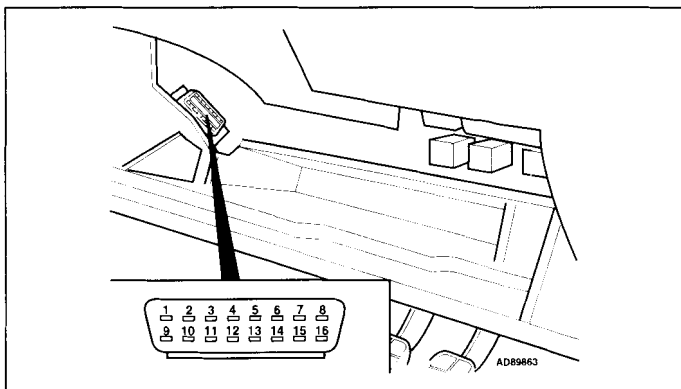
### Data link connector (DLC) locations



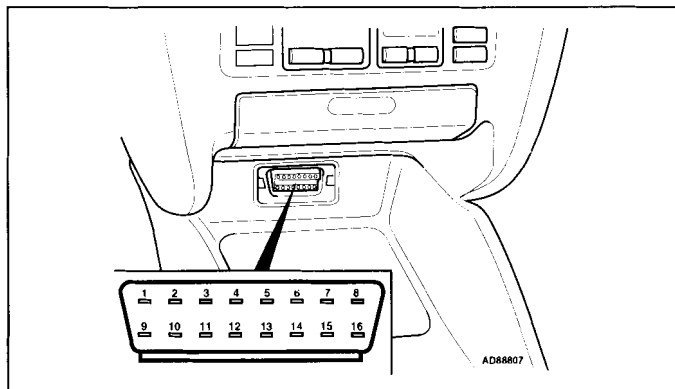
Arosa →08/00, Ibiza/Cordoba 1999-2002, Inca 2000 → – in fascia fusebox



Toledo →03/99 – adjacent to steering column



Ibiza/Cordoba →1999, Inca →2000 – glovebox, driver's side



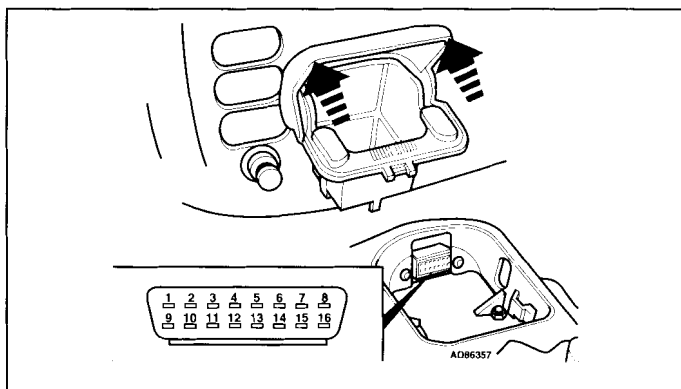
Arosa 09/00→, Toledo 1999→, Leon – centre console

Model: Arosa • Ibiza/Cordoba 1,0/1,4/1,6/1,8/2,0  
 Ibiza/Cordoba 1,7/1,9 D/TD/SDI/TDI • Toledo 1,6/2,0  
 Toledo 1,9 D/TD/TDI • Toledo/Leon • Alhambra • Inca 1,4/1,6  
 Inca 1,9 D/SDI

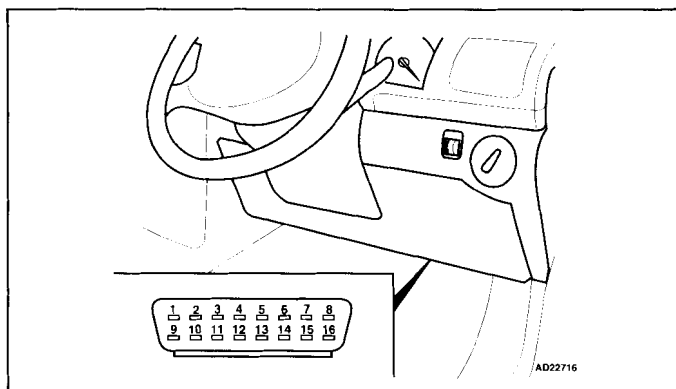
**SEAT**



Engine management



Alhambra →05/00 – centre console



Alhambra 06/00 → – fascia, driver's side

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Carry out road test for at least 10 minutes.
- Except 2,8: Ensure accelerator pedal is briefly fully depressed and engine speed exceeds 3500 rpm.
- 2,8: Ensure accelerator pedal is briefly fully depressed and engine speed exceeds 4600 rpm.
- Automatic transmission in 'P' or 'N'.
- If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.
- Data link connector (DLC) – 2-pin: (A) black, (B) brown/white.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

- Refer to Volkswagen Golf/Bora 1997 →, see page 722.



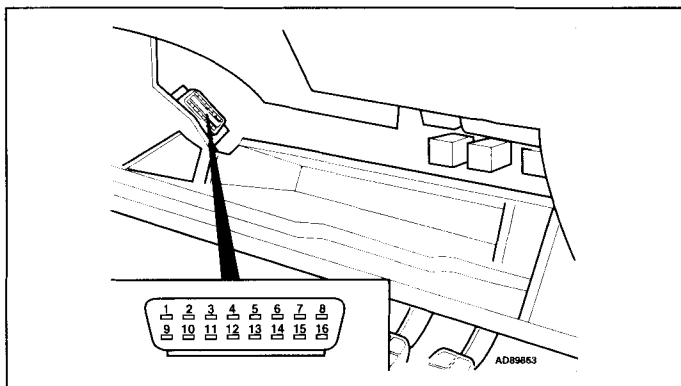
**SEAT**

Model: Ibiza/Cordoba 1,05 • Ibiza/Cordoba 1,3  
Ibiza/Cordoba 1,8

Year: 1993-97

Engine code: ABS, AAU, AAV

System: Bosch Mono-Motronic MA1.2.2

**Engine management****Data link connector (DLC) locations****In glovebox, driver's side****Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to one of the ECM terminals.
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Self-diagnosis using flash type trouble codes may not display all available diagnostic information.
- Carry out road test for at least 10 minutes.
- Ensure accelerator pedal is briefly fully depressed and engine speed exceeds 3000 rpm.

**Accessing**

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 4 and 15 with a switched lead – contacts normally open **1**.

**NOTE: DLC terminal 15 is connected to ECM terminal 11.**

- Connect LED test lamp between data link connector (DLC) terminal 16 and ECM terminal 4 **2**.
- ECM located in plenum chamber.

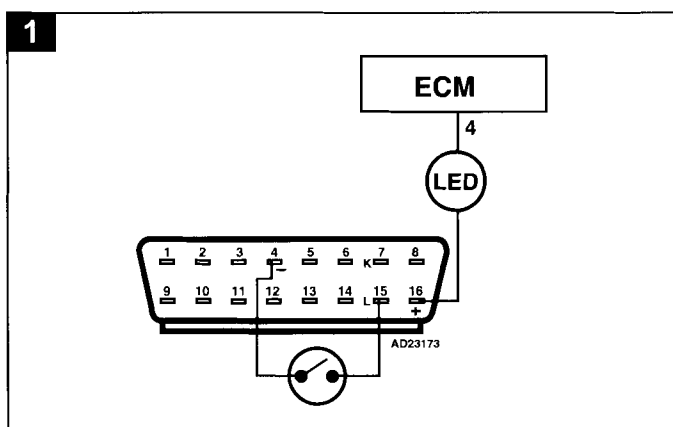
**NOTE: DO NOT disconnect ECM multi-plug as this will erase fault memory.**

- Start engine. Allow to idle.

**NOTE: If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.**

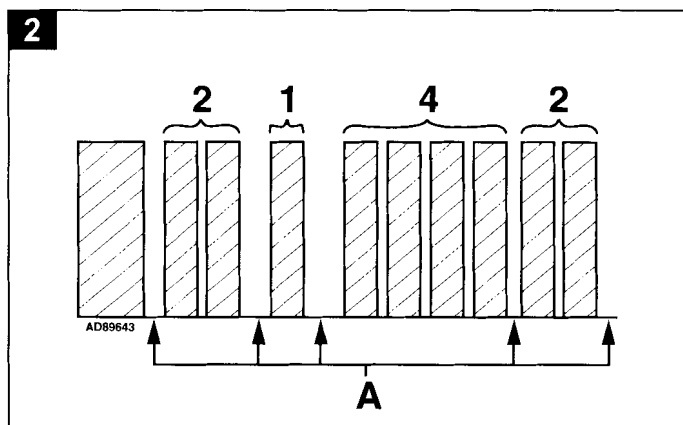
- Operate switch for 4 seconds minimum.
- Release switch. Check that LED flashes.
- Count LED flashes. Note trouble code.

- Each trouble code consists of four groups of one to four flashes.
- A 2,5 second pause separates each trouble code group **2** [A].
- Repeat switch operation. Note trouble codes. Compare with trouble code table.
- End of test sequence indicated by trouble code 0000 (long flashes).
- Switch ignition OFF. Rectify faults as necessary.





2



## Erasing

## Method 1

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 4 and 15 with a switched lead – contacts normally open **1**.

NOTE: DLC terminal 15 is connected to ECM terminal 11.

- Connect LED test lamp between data link connector (DLC) terminal 16 and ECM terminal 4 **1**.

- Access trouble codes. Switch ignition OFF.
- Operate switch and hold.
- Switch ignition ON.
- Release switch after 5 seconds. Check that LED flashes.
- Idle speed control (ISC) actuator activated. Trouble code displayed: 1232.
- Operate switch for 4-6 seconds to activate each of the following components:
  - Intake manifold heater. Trouble code displayed: 4342.
  - Evaporative emission (EVAP) canister purge valve. Trouble code displayed: 4343.
- After activation of last component operate switch for 4-6 seconds to display flash code 0000 (long flashes).
- Fault memory automatically erased.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

## Method 2

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug or battery earth lead.

NOTE: ECM adaptive memory may be erased causing erratic running faults. Carry out road test to allow ECM to re-learn basic values.

WARNING: Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).

## Trouble code identification

Flash type 4-digit	Fault location	Probable cause
0000	End of test sequence	–
1111	Engine control module (ECM)	ECM
1231	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
1232	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
2113 <b>1</b>	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
2212	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
2234	Engine control module (ECM) – supply voltage	Battery, wiring
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2322	Intake air temperature (IAT) sensor	Wiring, IAT sensor
2341 <b>2</b>	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
2342	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
2413 <b>3</b>	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
4444	No fault found	–

**1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.

**2** After repairs, erase learnt lambda control values: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.

**SEAT**

Model: Ibiza/Cordoba 1,05 • Ibiza/Cordoba 1,3 • Ibiza/Cordoba 1,8

**Engine management**

VAG type 5-digit	Fault location	Probable cause
00000	No fault found	—
00281	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00282	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
00515 <b>1</b>	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
00516	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
00518	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	Intake air temperature (IAT) sensor	Wiring, IAT sensor
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
00532	Engine control module (ECM) – supply voltage	Battery, wiring
00537 <b>2</b>	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
00561 <b>2</b>	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
00670	Idle speed control (ISC) actuator position sensor	Wiring, throttle valve, ISC actuator position sensor
17978	Engine control module (ECM) immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective
65535	Engine control module (ECM)	ECM

**1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.

**2** After repairs, erase learnt lambda control values: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.



Model: Ibiza/Cordoba 1,05 • Ibiza/Cordoba 1,3  
Ibiza/Cordoba 1,8

Year: 1993-97

Engine code: ABS, AAU, AAV

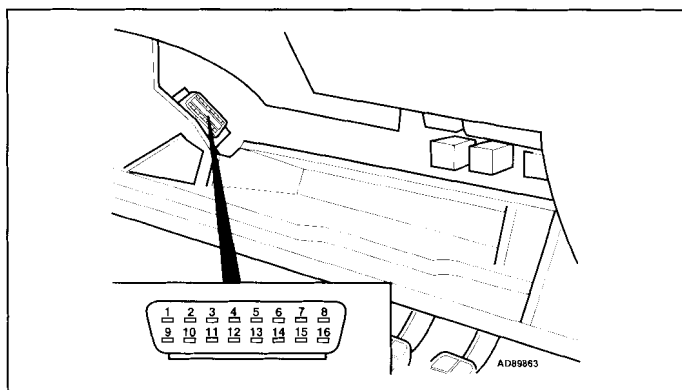
System: Bosch Mono-Motronic MA1.2.3

**SEAT**



## Engine management

### Data link connector (DLC) locations



In glovebox, driver's side

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Carry out road test for at least 10 minutes.
- Ensure accelerator pedal is briefly fully depressed and engine speed exceeds 3000 rpm.
- If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.

#### Accessing

- The engine control module (ECM) fault memory can only be accessed using diagnostic equipment connected to the data link connector (DLC).

#### Erasing

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug or battery earth lead.

**NOTE:** *ECM adaptive memory may be erased causing erratic running faults. Carry out road test to allow ECM to re-learn basic values.*

- Diagnostic equipment can also be used to erase data from ECM fault memory.

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

#### Trouble code identification

Flash type 4-digit	Fault location	Probable cause
0000	End of test sequence	–
1111	Engine control module (ECM)	ECM
1231	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
1232	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
2113 ■	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
2212	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
2234	Engine control module (ECM) – supply voltage	Battery, wiring

**SEAT**

Model: Ibiza/Cordoba 1,05 • Ibiza/Cordoba 1,3 • Ibiza/Cordoba 1,8

**Engine management**

Flash type 4-digit	Fault location	Probable cause
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2322	Intake air temperature (IAT) sensor	Wiring, IAT sensor
2341	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
2342	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
2413	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
4444	No fault found	–

Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.

After repairs, erase learnt lambda control values: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.

VAG type 5-digit	Fault location	Probable cause
00000	No fault found	–
00281	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00282	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
00515	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
00516	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
00518	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	Intake air temperature (IAT) sensor	Wiring, IAT sensor
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
00532	Engine control module (ECM) – supply voltage	Battery, wiring
00537	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
00561	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
00670	Idle speed control (ISC) actuator position sensor	Wiring, throttle valve, ISC actuator position sensor
17978	Engine control module (ECM) immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/ immobilizer replacement without coding, wiring, immobilizer defective
65535	Engine control module (ECM)	ECM

Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.

After repairs, erase learnt lambda control values: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.





Model: Ibiza/Cordoba 1,4/1,6 • Ibiza/Cordoba 1,8  
Toledo 1,6/1,8 • Inca 1,6

Year: 1993-00

Engine code: 1F, ABD, ABS, ABU, ACC, ADZ

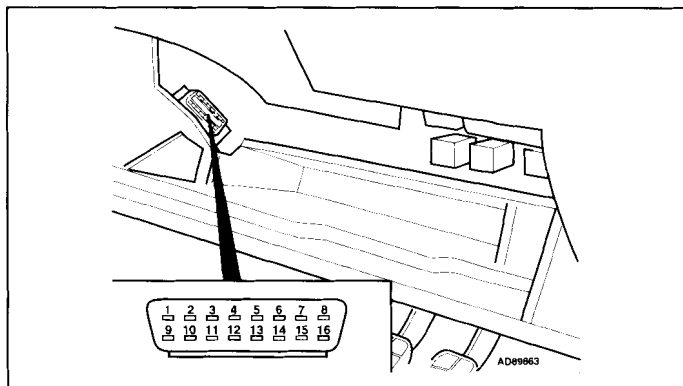
System: Bosch Mono-Motronic MA1.2.3

**SEAT**

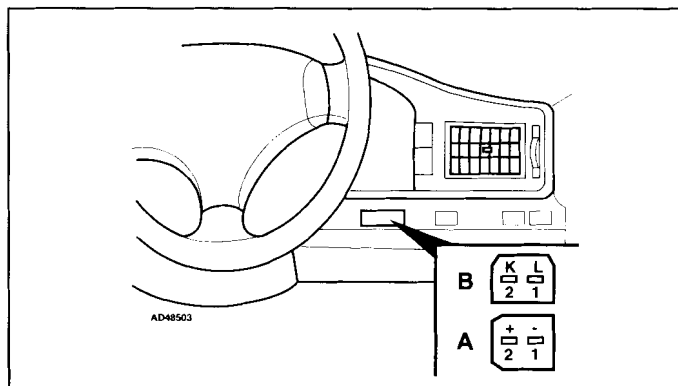


## Engine management

### Data link connector (DLC) locations



Ibiza/Cordoba, Inca – driver's glovebox



Toledo – adjacent to steering column

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Carry out road test for at least 10 minutes.
- Ensure accelerator pedal is briefly fully depressed and engine speed exceeds 3000 rpm.
- If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.

#### Accessing

- The engine control module (ECM) fault memory can only be accessed using diagnostic equipment connected to the data link connector (DLC).

#### Erasing

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug or battery earth lead.

**NOTE:** *ECM adaptive memory may be erased causing erratic running faults. Carry out road test to allow ECM to re-learn basic values.*

- Diagnostic equipment can also be used to erase data from ECM fault memory.

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

**SEAT**Model: Ibiza/Cordoba 1,4/1,6 • Ibiza/Cordoba 1,8 • Toledo 1,6/1,8  
Inca 1,6**Engine management****Trouble code identification**

VAG type	Fault location	Probable cause
00000	No fault found	–
00281	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00282	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
00515 <sup>1</sup>	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
00516	Closed throttle position (CTP) switch	Accelerator cable adjustment, wiring, CTP switch
00518	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	Intake air temperature (IAT) sensor	Wiring, IAT sensor
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
00532	Engine control module (ECM) – supply voltage	Battery, wiring
00537 <sup>2</sup>	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
00561 <sup>2</sup>	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
00670	Idle speed control (ISC) actuator position sensor	Wiring, throttle valve, ISC actuator position sensor
17978	Engine control module (ECM) immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective
65535	Engine control module (ECM)	ECM

<sup>1</sup> Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.

<sup>2</sup> After repairs, erase learnt lambda control values as follows: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.



Model: Arosa • Ibiza/Cordoba • Toledo • Toledo/Leon

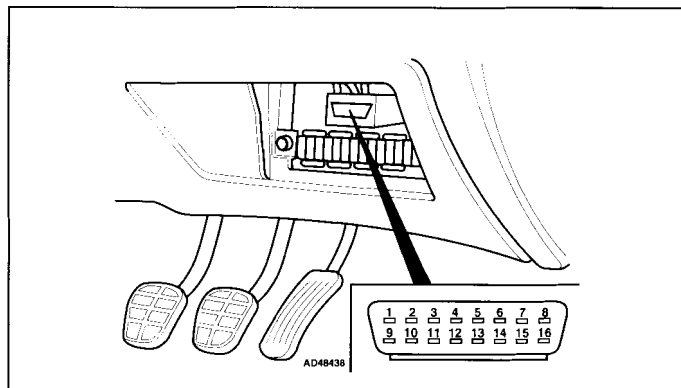
Year: 1991-02

SEAT

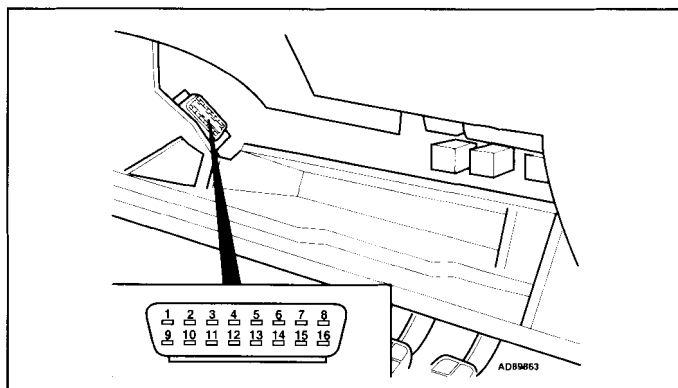


Transmission

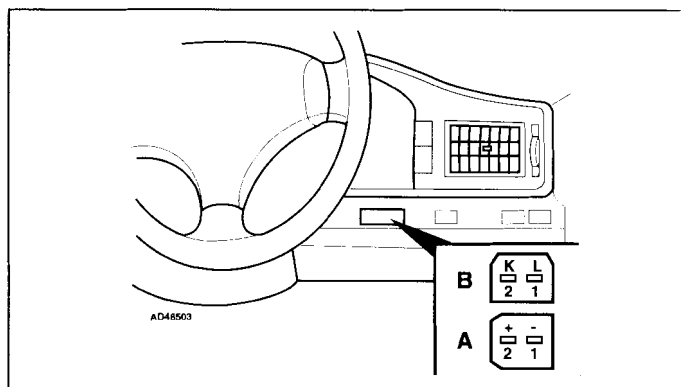
## Data link connector (DLC) locations



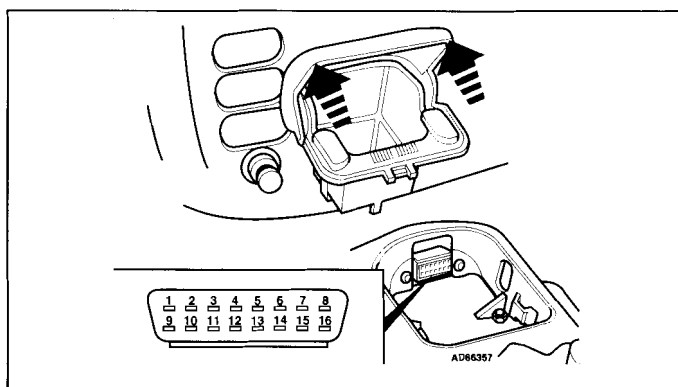
Arosa, Ibiza/Cordoba 1999 → - in fascia fusebox



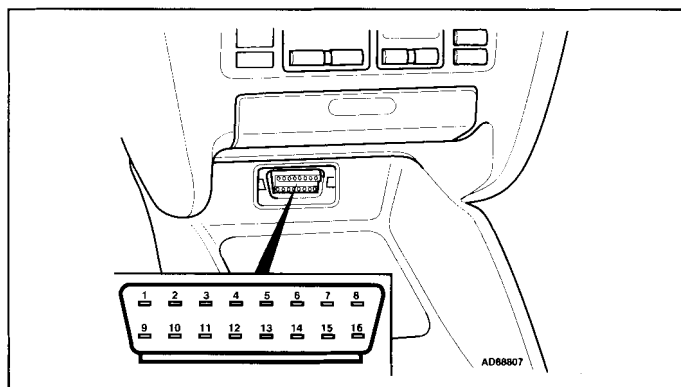
Ibiza/Cordoba →1999 - driver's glovebox



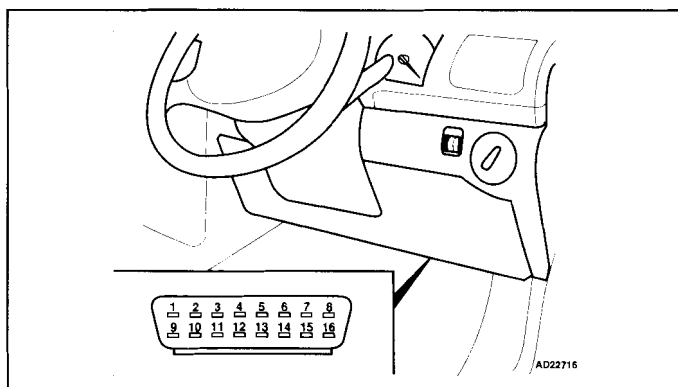
Toledo →03/99 - adjacent to steering column



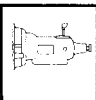
Alhambra →05/00 - centre console



Toledo 03/99 →, Leon - centre console



Alhambra 06/00 → - fascia, driver's side

**SEAT**

Model: Arosa • Ibiza/Cordoba • Toledo • Toledo/Leon • Alhambra

**Transmission****Trouble codes****4motion – manual 5/6 speed 4WD**

**NOTE:** *Vehicle equipped with an electronically controlled Haldex coupling.*

**General information**

- ☐ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

**Accessing and erasing**

- The four wheel drive control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification**

- Refer to Volkswagen Golf/Bora 1997 →, see page 776.

**Automatic****General information**

- ☐ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ☐ Automatic transmission in 'P'.
- ☐ Data link connector (DLC) – 2-pin: (A) black, (B) brown/white.

**Accessing and erasing**

- The transmission control module (TCM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification**

- Refer to Volkswagen Golf/Bora 1997 →, see page 776.



Model: Arosa • Ibiza/Cordoba • Toledo • Toledo/Leon  
Alhambra • Inca

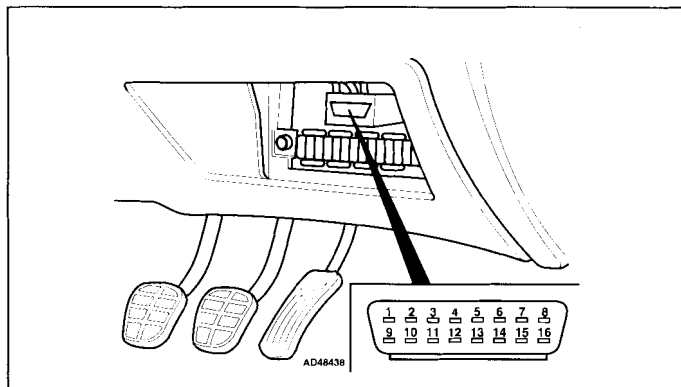
Year: 1995-02

**SEAT**

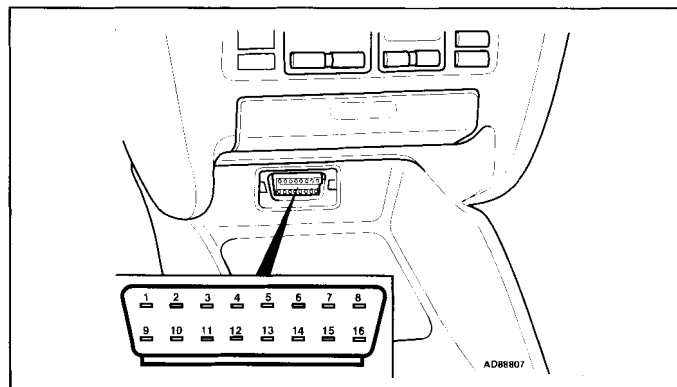


Immobilizer

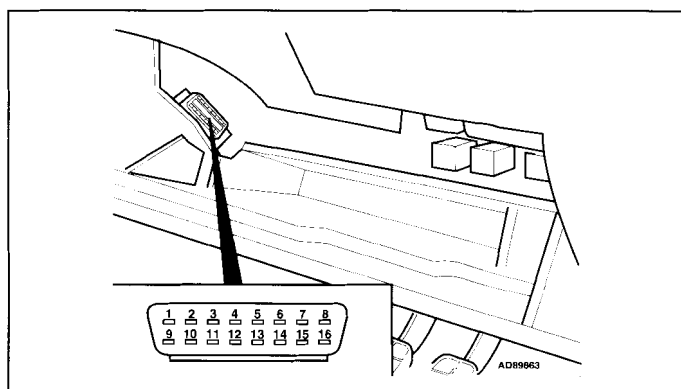
## Data link connector (DLC) locations



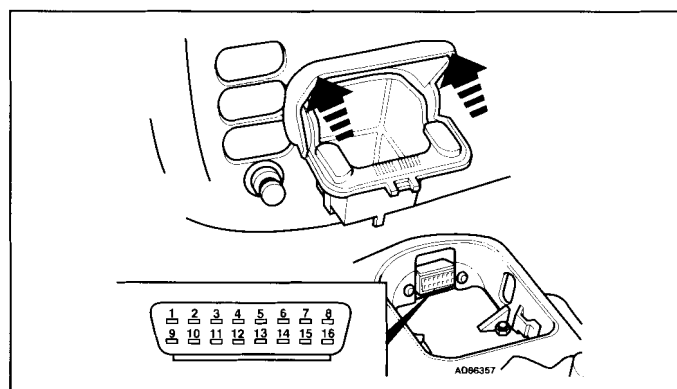
Arosa, Ibiza/Cordoba 1999 → – in fascia fusebox



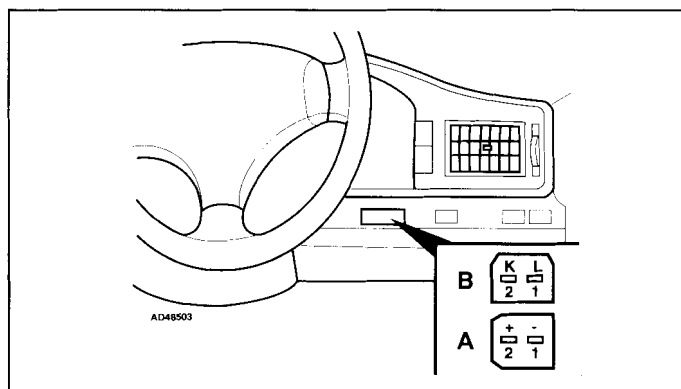
Toledo 03/99 →, Leon – centre console



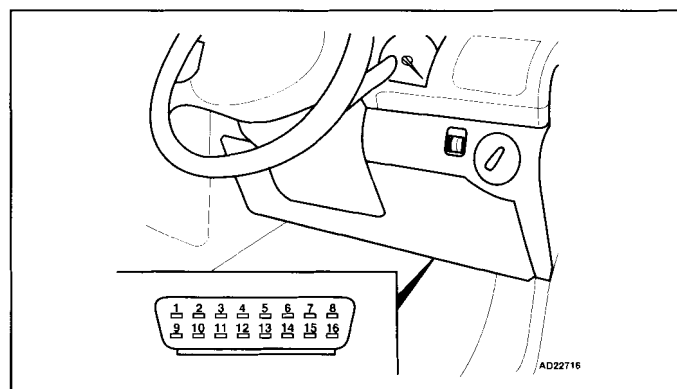
Ibiza/Cordoba →1999, Inca – driver's glovebox



Alhambra →05/00 – centre console



Toledo →03/99 – adjacent to steering column



Alhambra 06/00 → – fascia, driver's side



# SEAT

Model: Arosa • Ibiza/Cordoba • Toledo • Toledo/Leon • Alhambra  
Inca

## Immobilizer

### Trouble codes

#### General information

- ☐ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ☐ System malfunction: Engine runs for approximately 1 second and then cuts out.
- ☐ Data link connector (DLC) – 2-pin: (A) black, (B) brown/white.

#### Accessing and erasing

- The immobilizer control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

- Refer to Volkswagen Golf/Bora 1997 →, see page 788.



Model: Favorit 1,3 • Favorit Van/Forman Pick-up 1,3  
Felicia 1,3

Year: 08/93-96

Engine code: 781.135B, 781.136B

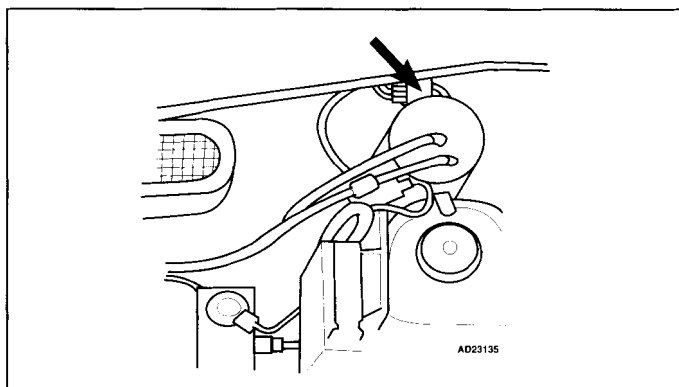
System: Bosch Mono-Motronic MA1.2.3

**SKODA**



Engine management

## Data link connector (DLC) locations



Engine bay, LH rear

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Carry out road test for at least 10 minutes.
- If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.

### Accessing

- The engine control module (ECM) fault memory can only be accessed using diagnostic equipment connected to the data link connector (DLC).

**NOTE:** DLC terminal 1 is not connected to ECM terminal 11.

### Erasing

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug or battery earth lead.

**NOTE:** ECM adaptive memory may be erased causing erratic running faults. Carry out road test to allow ECM to re-learn basic values.

- Diagnostic equipment can also be used to erase data from ECM fault memory.

**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).

## Trouble code identification

Flash type 4-digit	Fault location	Probable cause
0000	End of test sequence	—
1111	Engine control module (ECM)	Wiring, ECM
1232	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
2113 ■	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
2212	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2322	Intake air temperature (IAT) sensor	Wiring, IAT sensor

**SKODA**

Model: Favorit 1,3 • Favorit Van/Forman Pick-up 1,3 • Felicia 1,3

## Engine management

Flash type 4-digit	Fault location	Probable cause
2341 <b>2</b>	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
2342	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
2413 <b>2</b>	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
4444	No fault found	–

- 1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.
- 2** After repairs, erase learnt lambda control values: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.

VAG type 5-digit	Fault location	Probable cause
00000	No fault found	–
00282	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
00515 <b>1</b>	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
00516	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
00518	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	Intake air temperature (IAT) sensor	Wiring, IAT sensor
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
00537 <b>2</b>	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
00561 <b>2</b>	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
65535	Engine control module (ECM)	Wiring, ECM

- 1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.
- 2** After repairs, erase learnt lambda control values as follows:  
 Favorit/Forman: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds.  
 Felicia: Erase using diagnostic equipment.  
 Carry out road test to allow ECM to re-learn basic values.





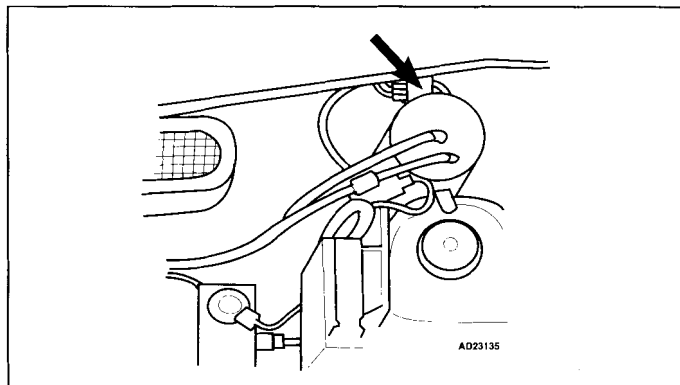
Model: Favorit Van/Forman Pick  
 Year: → 07/93  
 Engine code: 781.135B, 781.136B  
 System: Bosch Mono-Motronic MA1.2.2

**SKODA**



Engine management

## Data link connector (DLC) locations



Engine bay, LH rear

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Carry out road test for at least 10 minutes.
- Ensure accelerator pedal is briefly fully depressed and engine speed exceeds 3000 rpm.

### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 1 and 4 with a switched lead – contacts normally open **1**.

**NOTE:** DLC terminal 1 is connected to ECM terminal 11.

- Connect LED test lamp between data link connector (DLC) terminals 3 and 5 **1**.

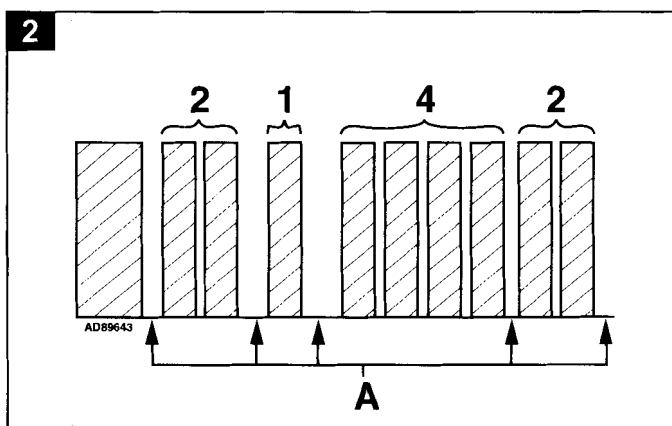
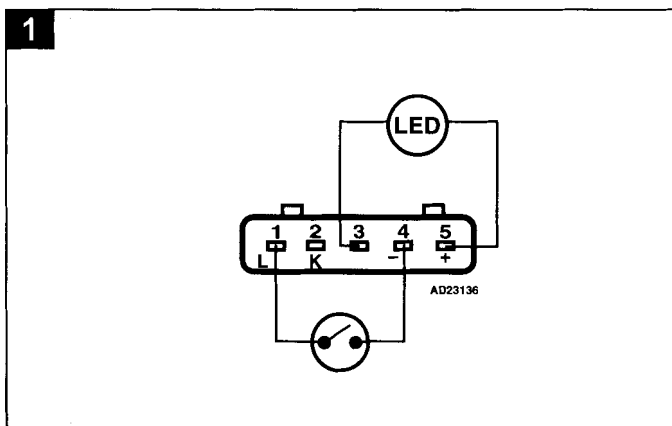
**NOTE:** DLC terminal 3 is connected to ECM terminal 4.

- Start engine. Allow to idle.

**NOTE:** If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.

- Operate switch for 4 seconds minimum.
- Release switch. Check that LED flashes.
- Count LED flashes. Note trouble code.
- Each trouble code consists of four groups of one to four flashes.
- A 2.5 second pause separates each trouble code group **2** [A].
- Repeat switch operation. Note trouble codes. Compare with trouble code table.

- End of test sequence indicated by trouble code 0000 (long flashes).
- Switch ignition OFF. Rectify faults as necessary.





## Engine management

### Erasing

#### Method 1

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 1 and 4 with a switched lead – contacts normally open **1**.
- Connect LED test lamp between data link connector (DLC) terminals 3 and 5 **1**.
- Access trouble codes. Switch ignition OFF.
- Operate switch and hold.
- Switch ignition ON.
- Release switch after 5 seconds. Check that LED flashes.
- Idle speed control (ISC) actuator activated. Trouble code displayed: 1232.
- Operate switch for 4-6 seconds to activate each of the following components:
- Intake manifold heater. Trouble code displayed: 4342.

- Evaporative emission (EVAP) canister purge valve. Trouble code displayed: 4343.
- After activation of last component operate switch for 4-6 seconds to display flash code 0000 (long flashes).
- Fault memory automatically erased.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

#### Method 2

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug or battery earth lead.

**NOTE:** *ECM adaptive memory may be erased causing erratic running faults. Carry out road test to allow ECM to re-learn basic values.*

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

### Trouble code identification

Flash type 4-digit	Fault location	Probable cause
0000	End of test sequence	–
1111	Engine control module (ECM)	Wiring, ECM
1232	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
2113 <b>1</b>	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
2212	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2322	Intake air temperature (IAT) sensor	Wiring, IAT sensor
2341 <b>■</b>	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
2342	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
2413 <b>2</b>	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
4444	No fault found	–

**1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.

**2** After repairs, erase learnt lambda control values: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.



VAG type 5-digit	Fault location	Probable cause
00000	No fault found	–
00282	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
00515 <b>1</b>	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
00516	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
00518	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	Intake air temperature (IAT) sensor	Wiring, IAT sensor
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
00537 <b>2</b>	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
00561 <b>2</b>	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
65535	Engine control module (ECM)	Wiring, ECM

**1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.

**2** After repairs, erase learnt lambda control values as follows:

Favorit/Forman: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds.

Felicia: Erase using diagnostic equipment.

Carry out road test to allow ECM to re-learn basic values.





# SKODA

Model:

Fabia • Felicia/Van/Pick-up • Octavia

Year:

1996-04

Engine code:

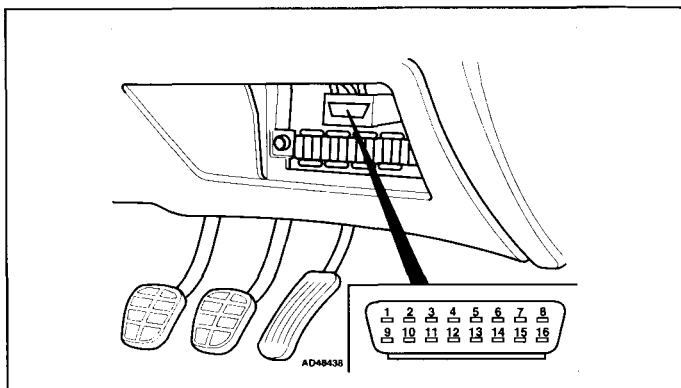
781.135M, 781.136M, AEE, AEF, AEG, AEH, AGN, AGP, AGR, AGU, AHF, AKL, ALH, AMD, AME, AMF, APK, AQM, AQV, AQW, AQY, ARV, ARX, ARZ, ASV, ASY, ATD, ATF, ATY, ATZ, AUA, AUB, AUM, AUQ, AVU, AWY, AXP, AZE, AZF, AZH, AZL, AZQ, AZJ, BBY, BBZ

System:

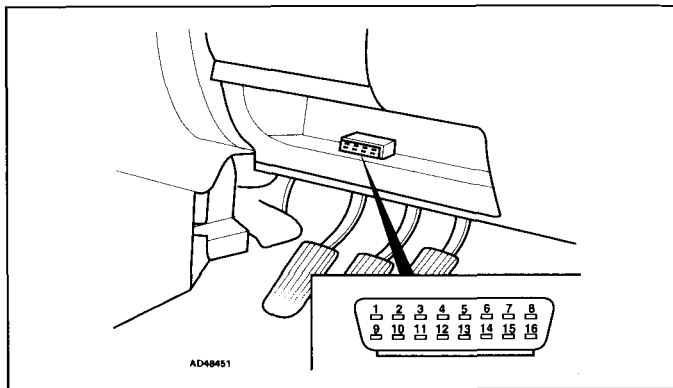
Bosch EDC/15P/V • Bosch Motronic M3.8.2/3/5  
Bosch Motronic M5.9.2 • Bosch Motronic ME7.5  
Magnet Marelli 1AV/4LV/4MV • Siemens Simos

## Engine management

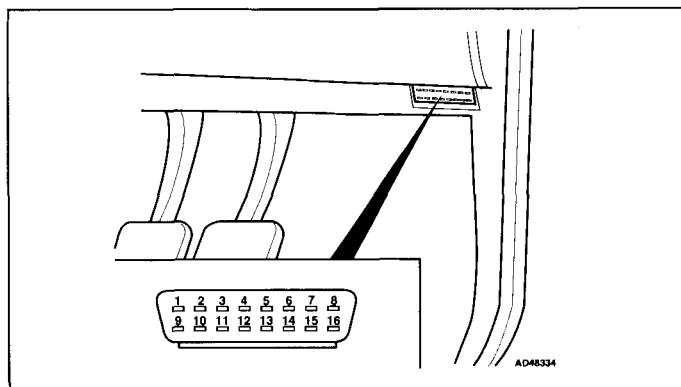
### Data link connector (DLC) locations



Fabia – behind storage compartment, driver's side



Octavia – storage compartment, driver's side



Felicia/Van/Pick-up – fascia, driver's side

### Trouble codes

#### General information

- ❑ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ❑ Carry out road test for at least 10 minutes.
- ❑ Ensure accelerator pedal is briefly fully depressed and engine speed exceeds 3000 rpm.
- ❑ Automatic transmission in 'P' or 'N'.
- ❑ If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

- Refer to Volkswagen Golf/Bora 1997 →, see page 722.



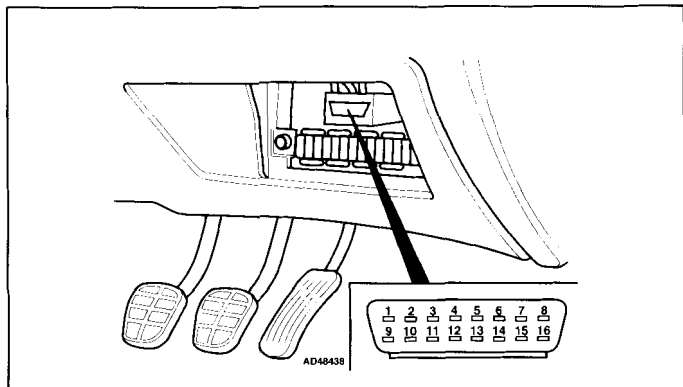
Model: Fabia • Octavia  
Year: 1996-02

**SKODA**

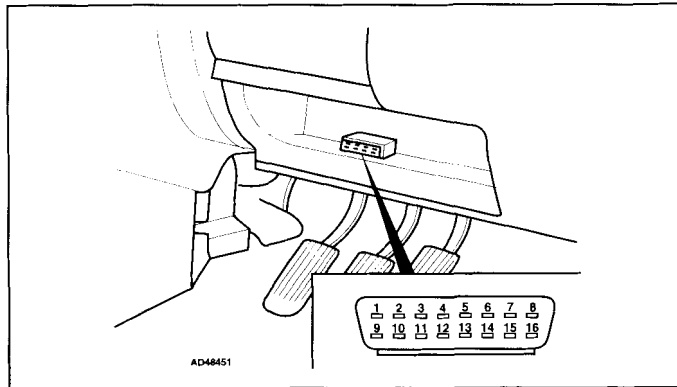


Transmission

## Data link connector (DLC) locations



Fabia – in fascia fusebox



Octavia – storage compartment, driver's side

## Trouble codes

### 4motion – manual 5/6 speed 4WD

**NOTE:** Vehicle equipped with an electronically controlled Haldex coupling.

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The four wheel drive control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

- Refer to Volkswagen Golf/Bora 1997 →, see page 776.

### Automatic

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Automatic transmission in 'P'.

#### Accessing and erasing

- The transmission control module (TCM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

- Refer to Volkswagen Golf/Bora 1997 →, see page 776.



**SKODA**

Model:

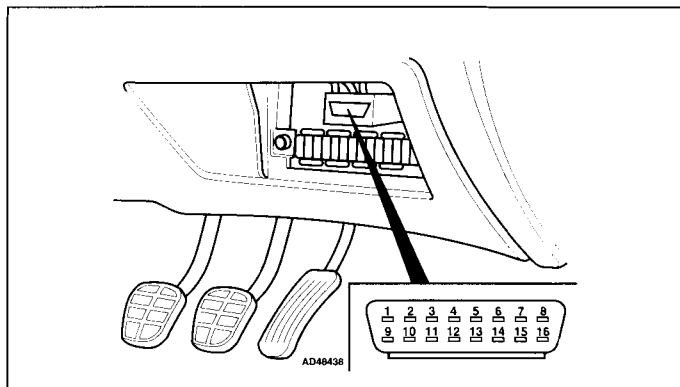
Fabia • Felicia/Van/Pick-up • Octavia

Year:

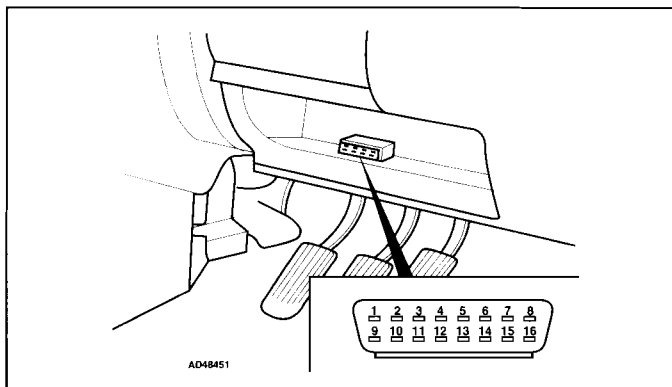
1995-02

Immobilizer

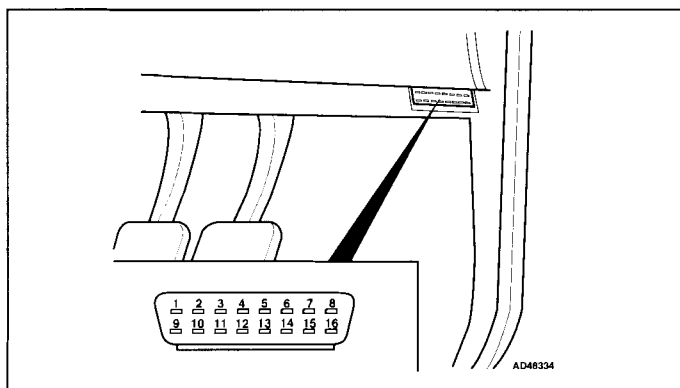
## Data link connector (DLC) locations



Fabia – in fascia fusebox



Octavia – storage compartment, driver's side



Felicia/Van/Pick-up – fascia, driver's side

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- System malfunction: Engine runs for approximately 1 second and then cuts out.

### Accessing and erasing

- The immobilizer control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

- Refer to Volkswagen Golf/Bora 1997 →, see page 788.



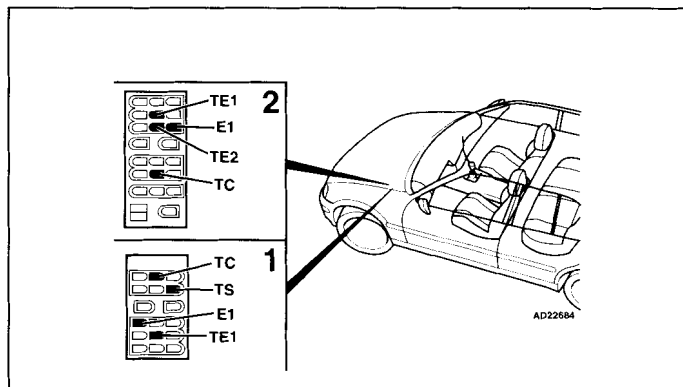
Model: Starlet 1,3  
 Year: 1990-99  
 Engine code: 2E-E, 4E-FE  
 System: TCCS

**TOYOTA**



Engine management

## Data link connector (DLC) locations



[1] – SOHC

[2] – DOHC

## Trouble codes

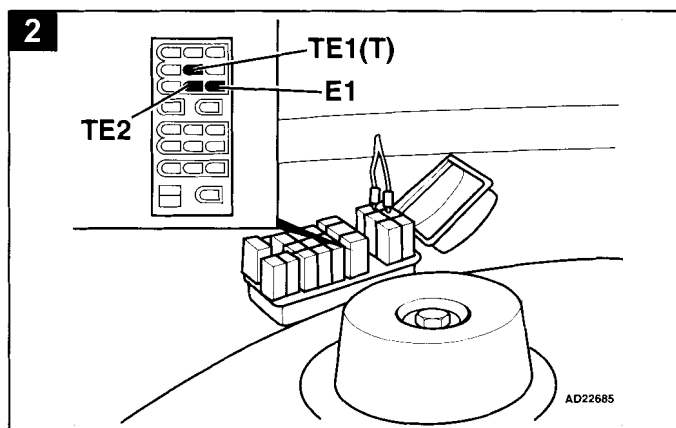
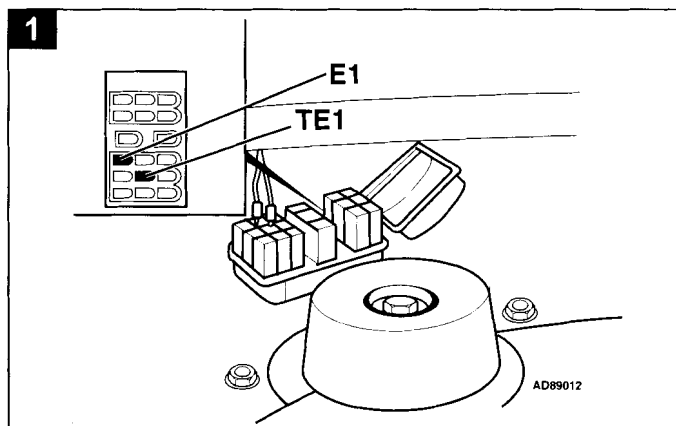
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- Late models: The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

### Accessing

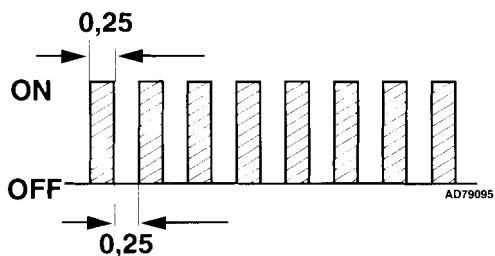
#### Normal mode

- Switch ignition ON.
- Bridge data link connector (DLC) terminals E1 and TE1.  
SOHC: **1**. DOHC: **2**.
- If no trouble codes are stored, the lamp will flash twice per second **3**.
- Each trouble code consists of two groups of one or more flashes **4** [A].
- Warning lamp flash duration: 0,5 second **4** [B].
- A 0,5 second pause separates each flash **4** [C].
- A 1,5 second pause separates each trouble code group **4** [D].
- A 2,5 second pause separates each trouble code **4** [E].
- For example: Two 0,5 second flashes – 1,5 second pause – one 0,5 second flash. Trouble code 21 displayed **4** – oxygen sensor (O2S)/heated oxygen sensor (HO2S).
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.

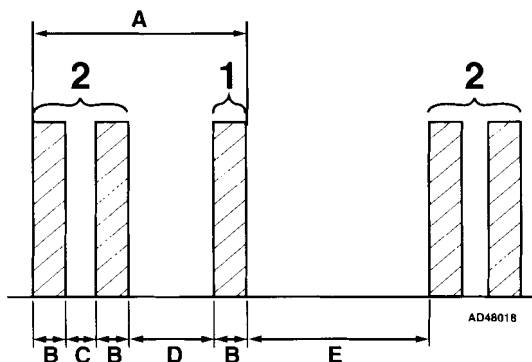




3



4



### Test mode – DOHC

- Switch ignition OFF.
- Bridge data link connector (DLC) terminals E1 and TE2 **2**.
- Switch ignition ON.
- Ensure malfunction indicator lamp (MIL) flashes four times per second.
- Start engine.
- Drive vehicle at over 6 mph (10 km/h).
- Stop vehicle. Do not switch ignition OFF.
- With data link connector (DLC) terminals E1 and TE2 bridged, bridge terminals E1 and TE1 **2**.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.
- Remove bridge wires.
- Rectify faults as necessary.

**NOTE:** Codes 42 and 43 may be produced if this procedure is NOT carried out correctly. Code 51 will be produced during this procedure and can be ignored.

### Erasing

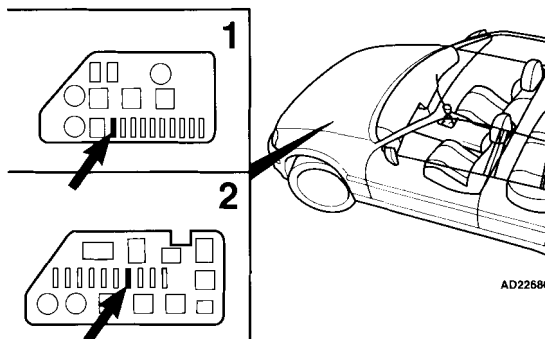
**NOTE:** Fuse removal duration depends on ambient temperature. The lower the temperature the longer the fuse must be removed.

- Switch ignition OFF.
- Remove EFI fuse (15A) from underbonnet fusebox for 10 seconds minimum. SOHC: Location **5** [1] & [2]. DOHC: Location **6** [3] & [4].
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

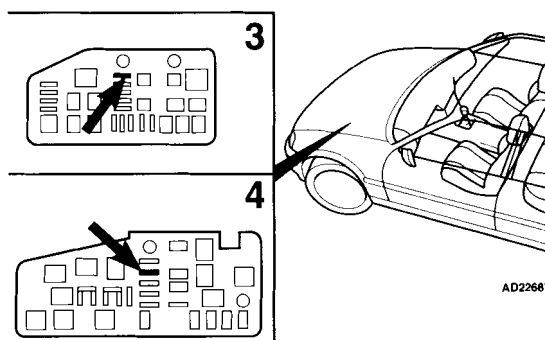
**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.

5



6





**Trouble code identification**

Flash type	Fault location	Probable cause
11111	No fault found	—
12	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal	Wiring, CKP/RPM sensor, ignition amplifier, ECM
13	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal over 1500 rpm	Wiring, CKP/RPM sensor, ECM
14	Ignition signal – no signal	Wiring, ignition amplifier, ignition coil, ECM
21	2E-E: Oxygen sensor (O2S)	Wiring, O2S, ECM
	4E-FE: Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
22	Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
25	Weak mixture	Wiring, injector, O2S/HO2S, ECM, fuel pressure, air leak, MAP sensor, ignition system
26	Rich mixture	Wiring, injector, fuel pressure, MAP sensor, cold start injector, ECM
31	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
33	Idle air control (IAC) valve	Wiring, IAC valve, ECM
41	Throttle position (TP) sensor	Wiring, TP sensor, ECM
42	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
43	Starter signal	Wiring, ignition switch, ECM
51	Switch signal – AC switch ON during diagnosis	Wiring, AC switch, AC control module, ECM
	Switch signal – PNP switch not in P or N during diagnosis	Wiring, PNP switch, ECM
	Switch signal – throttle position (TP) sensor, NO closed throttle signal during diagnosis	Wiring, TP sensor, ECM





# TOYOTA

Model: Corolla 1,3 • Corolla 1,6 GT • Corolla 1,6  
Corolla 1,8 • Corolla 2,0D

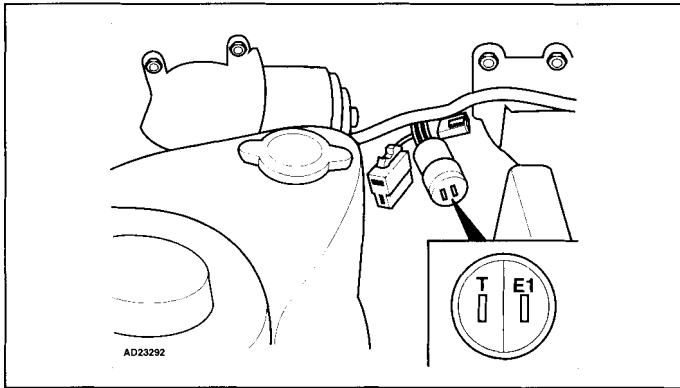
Year: 1984-01/00

Engine code: 2C, 2C-E, 2E-E, 4A-FE, 4A-GE, 4E-FE, 7A-FE

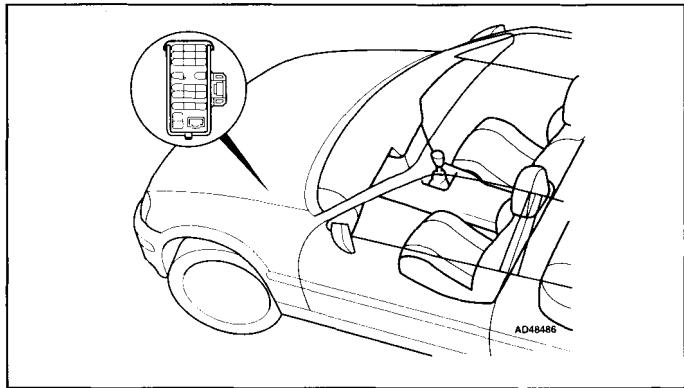
System: TCCS

## Engine management

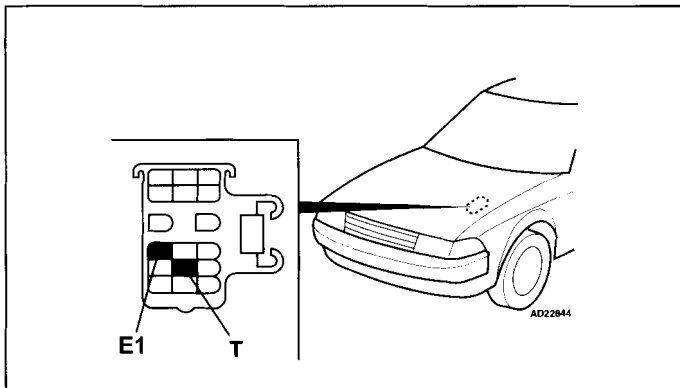
### Data link connector (DLC) locations



1984-87



1992-01/00



1987-92

### Trouble codes

#### General information

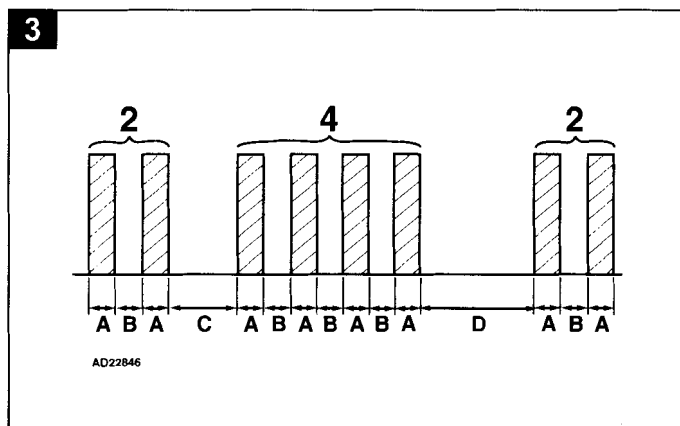
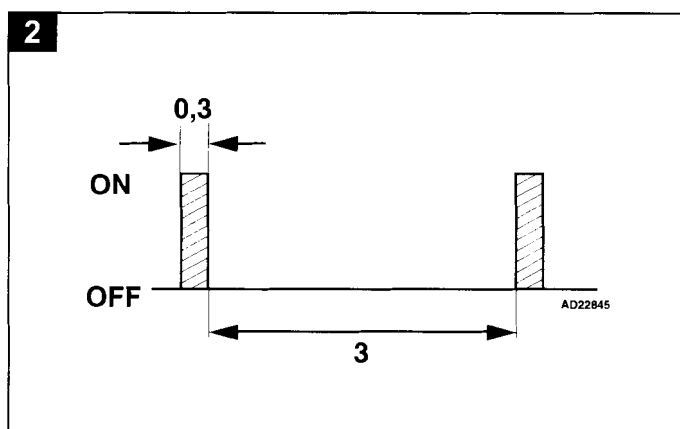
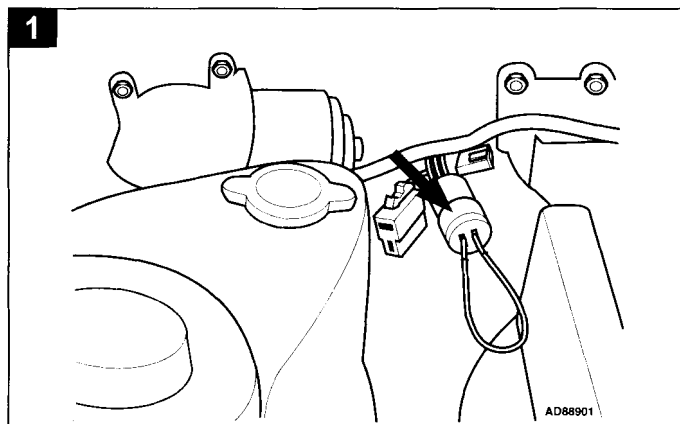
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- 1997 →: The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

- A 0,7 second pause separates each flash **3** [B].
- A 3 second pause separates each trouble code **3** [C].
- For example: Trouble codes 2 and 4 displayed **3**.
- Trouble codes are repeated 3 seconds after last trouble code **3** [D].
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.
- Remove bridge wire.
- Rectify faults as necessary.

#### Accessing

##### 1984-87

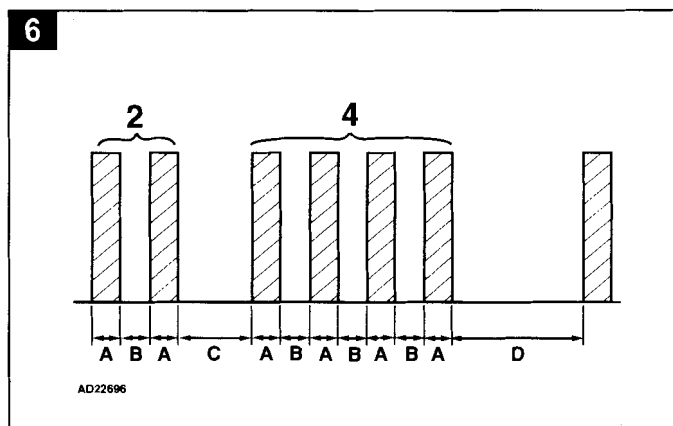
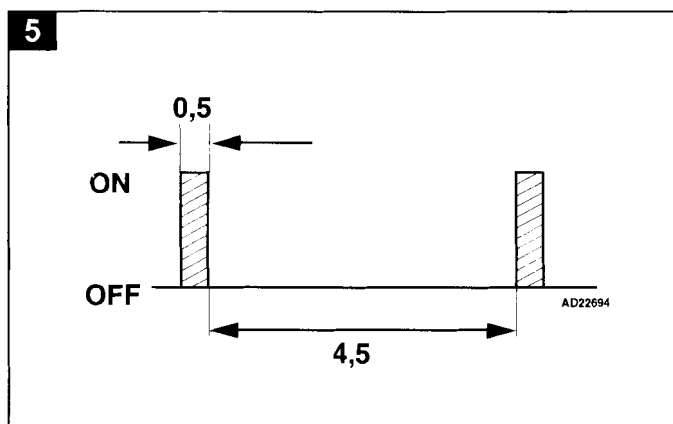
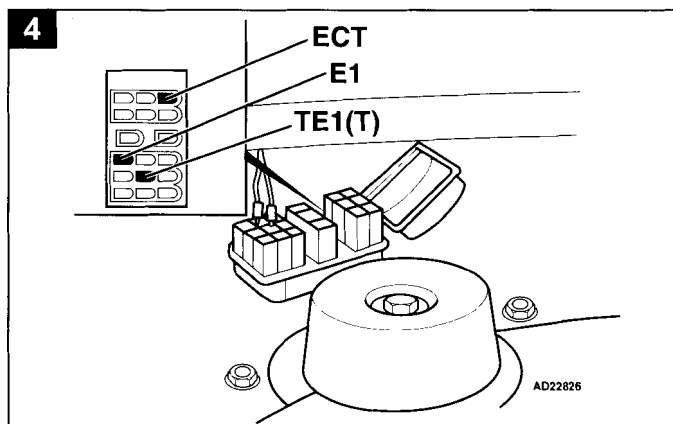
- Switch ignition ON.
- Bridge diagnostic socket terminals **1**.
- If no trouble codes are stored, the lamp will flash once every 3 seconds **2**.
- Individual short flashes display trouble code **3**.
- Warning lamp flash duration: 0,3 seconds **3** [A].



**4A-GE 1987-89 – with manifold absolute pressure (MAP) sensor**

- Switch ignition ON.
- Bridge data link connector (DLC) terminals E1 and TE1 (T) **4**.
- If no trouble codes are stored, the lamp will flash once every 4,5 seconds **5**.
- Individual short flashes display trouble code **6**.
- Warning lamp flash duration: 0,5 second **6** [A].
- A 0,5 second pause separates each flash **6** [B].
- A 2,5 second pause separates each trouble code **6** [C].
- For example: Trouble codes 2 and 4 displayed **6**.

- Trouble codes are repeated 4,5 seconds after last trouble code **6** [D].
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.
- Remove bridge wire.
- Rectify faults as necessary.



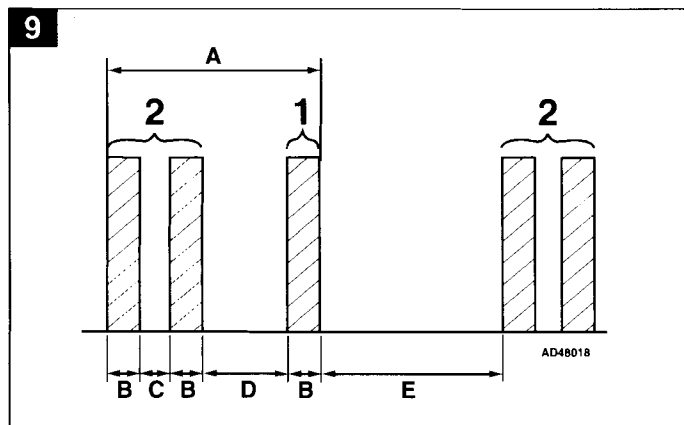
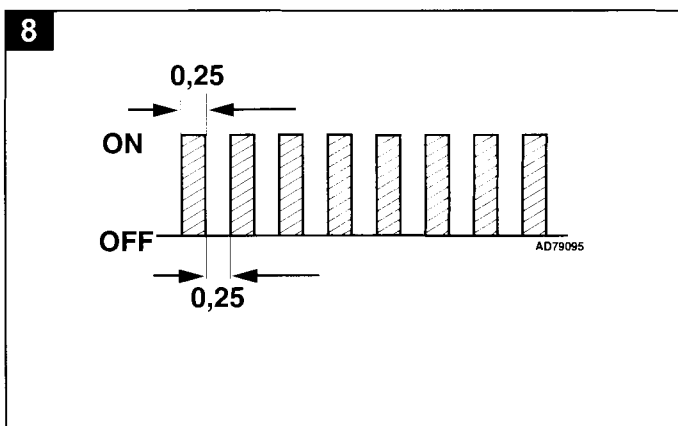
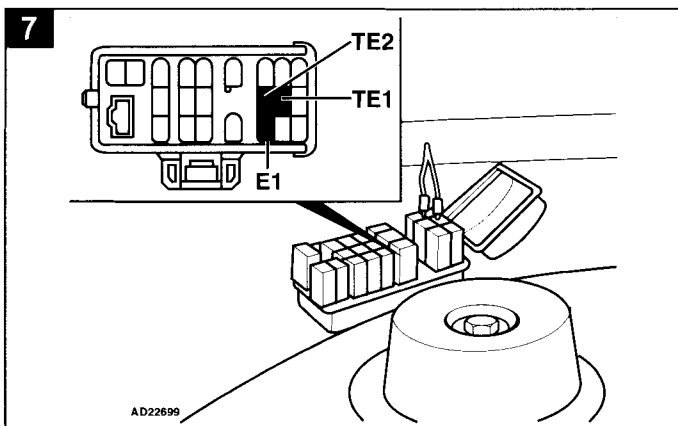


## Engine management

Except 4A-GE 1987-89 – with manifold absolute pressure (MAP) sensor

### Normal mode

- Switch ignition ON.
- Bridge data link connector (DLC) terminals E1 and TE1 (T).  
→ 1992: **4**. 1992 →: **7**.
- If no trouble codes are stored, the lamp will flash twice per second **8**.
- Each trouble code consists of two groups of one or more flashes **9** [A].
- Warning lamp flash duration: 0,5 second **9** [B].
- A 0,5 second pause separates each flash **9** [C].
- A 1,5 second pause separates each trouble code group **9** [D].
- A 2,5 second pause separates each trouble code **9** [E].
- For example: Two 0,5 second flashes – 1,5 second pause – one 0,5 second flash. Trouble code 21 displayed **9** – heated oxygen sensor (HO2S).
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.



### Test mode 1992-01/00

- Switch ignition OFF.
- Bridge data link connector (DLC) terminals E1 and TE2 **7**.
- Switch ignition ON.
- Ensure malfunction indicator lamp (MIL) flashes four times per second.
- Start engine.
- Drive vehicle at over 6 mph (10 km/h) to meet conditions of customer complaint.
- Stop vehicle. Do not switch ignition OFF.
- With data link connector (DLC) terminals E1 and TE2 bridged, bridge terminals E1 and TE1 **7**.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.
- Remove bridge wires.
- Rectify faults as necessary.

**NOTE:** Codes 42 and 43 may be produced if this procedure is NOT carried out correctly. Code 51 will be produced during this procedure and can be ignored.

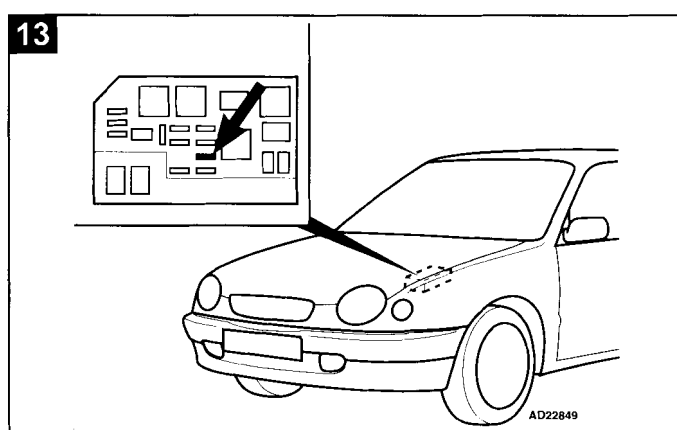
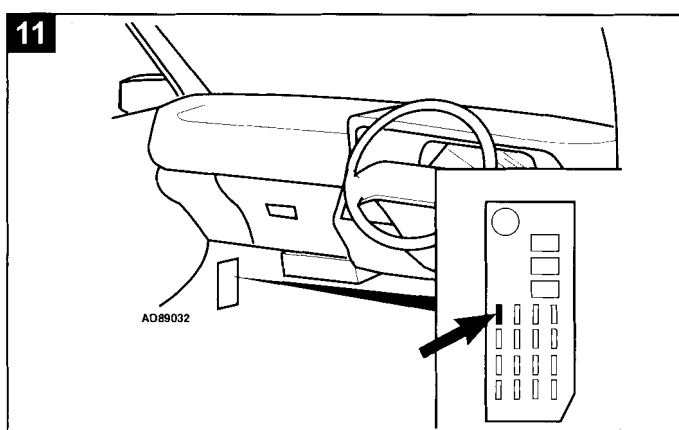
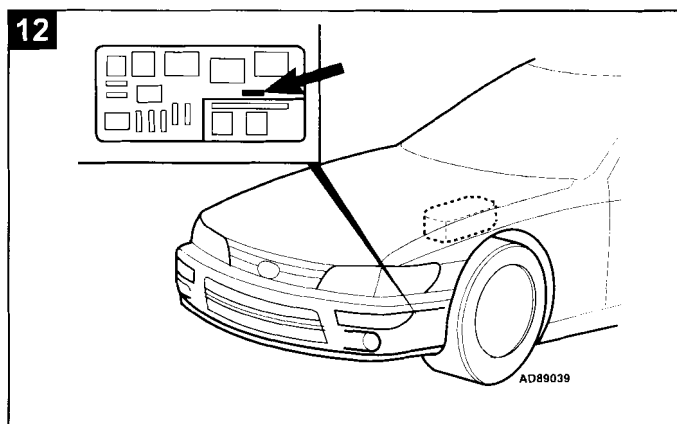
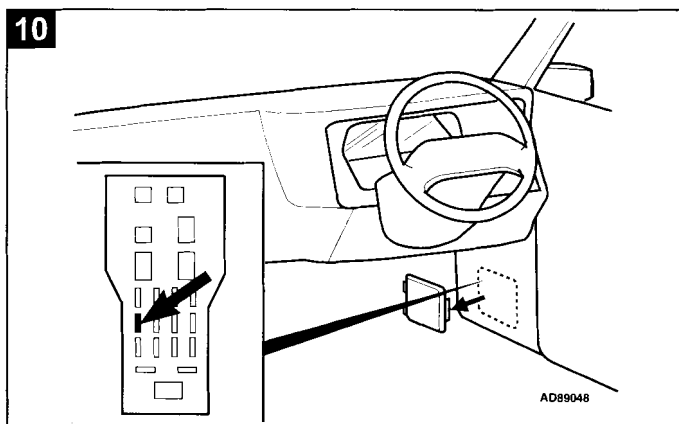
### Erasing

**NOTE:** Fuse removal duration depends on ambient temperature. The lower the temperature the longer the fuse must be removed.

- Switch ignition OFF.
- 1984-92: Remove STOP fuse (15A) from fascia fusebox for 10 seconds minimum. 1984-87: **10**. 1987-92: **11**.
- 1992-97: Remove EFI fuse (15A) from underbonnet fusebox for 10 seconds minimum **12**.
- 1997-00: Remove EFI/F-HTR fuse (15A) from underbonnet fusebox for 10 seconds minimum **13**.
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.



## Trouble code identification – petrol

### 4A-GE 1984-89 – with manifold absolute pressure (MAP) sensor

Flash type	Fault location	Probable cause
1	No fault found	–
2	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
3	Ignition amplifier – signal	Wiring, ignition amplifier, ECM
4	Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
6	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal	Wiring, CKP/RPM sensor, ignition amplifier, ECM
7	Throttle position (TP) sensor – open/short circuit	Wiring, TP sensor, ECM
8	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
9	Vehicle speed sensor (VSS) – signal	Wiring, VSS, ECM
10	Starter signal	Wiring, ignition switch, ECM
11	Switch signal – AC switch ON during diagnosis	Wiring, AC switch, AC control module, ECM
	Switch signal – PNP switch not in P or N during diagnosis	Wiring, PNP switch, ECM
	Switch signal – throttle position (TP) sensor, NO closed throttle signal during diagnosis	Wiring, TP sensor, ECM

**TOYOTA**Model: Corolla 1,3 • Corolla 1,6 GT • Corolla 1,6 • Corolla 1,8  
Corolla 2,0D**Engine management****Except 4A-GE 1984-89 – with manifold absolute pressure (MAP) sensor**

Flash type	Fault location	Probable cause
11111	No fault found	–
12	2E-E, 4E-FE: Crankshaft position (CKP) sensor – no signal	Wiring, CKP sensor, ignition amplifier, ECM
	4A-FE, 4A-GE: Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – no signal	Wiring, CKP/CMP sensor, ignition amplifier, ECM
13	Crankshaft position (CKP) sensor – no signal over idle	Wiring, CKP sensor, ignition amplifier, ECM
14	Ignition signal – no signal	Wiring, ignition amplifier, ECM
16	Transmission control signal	Wiring, ECM
21	Oxygen sensor (O2S)/heated oxygen sensor (HO2S)	Wiring, O2S/HO2S, ECM
22	Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
25	Weak mixture	Wiring, air leak, ignition system, fuel pressure, injector, VAF sensor, ECT sensor, IAT sensor, O2S/HO2S, ECM
26	Rich mixture	Wiring, ignition system, fuel pressure, injector, cold start injector, VAF sensor, ECT sensor, IAT sensor, O2S/HO2S, ECM
31	Manifold absolute pressure (MAP) sensor – circuit	Wiring, MAP sensor, ECM
	Volume air flow (VAF) sensor – circuit	Wiring, VAF sensor, ECM
33	Idle air control (IAC) valve	Wiring, IAC valve, ECM
41	Throttle position (TP) sensor	Wiring, TP sensor, ECM
42	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
43	Starter signal	Wiring, ignition switch, ECM
51	Switch signal – AC switch ON during diagnosis	Wiring, AC switch, AC control module, ECM
	Switch signal – PNP switch not in P or N during diagnosis	Wiring, PNP switch, ECM
	Switch signal – throttle position (TP) sensor, NO closed throttle signal during diagnosis	Wiring, TP sensor, ECM
52	Knock sensor (KS)	Wiring, KS, ECM
53	Knock control – malfunction	ECM
99	Immobilizer control system – malfunction	Wiring, immobilizer read coil amplifier, immobilizer read coil, immobilizer control module, ECM

**Trouble code identification – diesel 1997-01/00**

Flash type	Fault location	Probable cause
11111	No fault found	–
12	Crankshaft position (CKP) sensor – no signal	Wiring, CKP sensor, ECM
13	Injection pump position sensor – no signal over 1500 rpm	Wiring, injection pump position sensor, ECM
14	Timing control system – malfunction	Wiring, fuel filter, fuel injection timing solenoid, ECM
17	Engine control module (ECM) – malfunction	ECM

Model: Corolla 1,3 • Corolla 1,6 GT • Corolla 1,6 • Corolla 1,8  
Corolla 2,0D

**TOYOTA**



Engine management

Flash type	Fault location	Probable cause
22	Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
32	Module coding plug	Wiring, module coding plug, ECM
35	Manifold absolute pressure (MAP) sensor – open/short circuit	Wiring, MAP sensor, ECM
39	Fuel temperature sensor – open/short circuit	Wiring, fuel temperature sensor, ECM
41	Throttle position (TP) sensor	Wiring, TP sensor, ECM
42	Vehicle speed sensor (VSS)	Wiring, VSS, instrument panel, ECM
43	Starter signal	Wiring, ignition switch, ECM
51	Switch signal – AC switch ON during diagnosis	Wiring, AC switch, AC control module, ECM
	Switch signal – throttle position (TP) sensor, no closed throttle signal during diagnosis	Wiring, TP sensor, ECM
99	Immobilizer control system – malfunction	Wiring, immobilizer read coil amplifier, immobilizer read coil, immobilizer control module, ECM



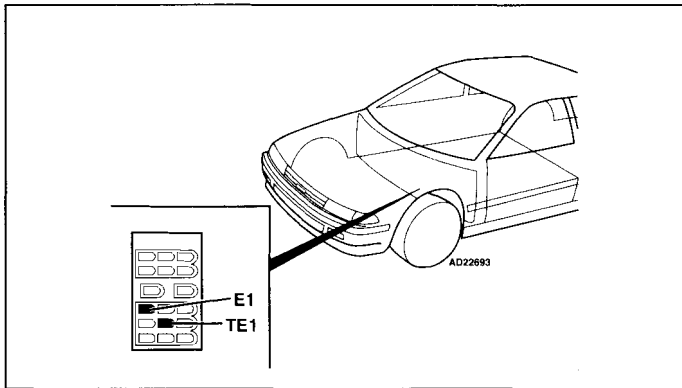


# TOYOTA

Model: Carina II 1,6 • Carina II 2,0  
Year: 1988-92  
Engine code: 3S-FE (with VAF sensor), 4A-FE  
System: TCCS

## Engine management

### Data link connector (DLC) location



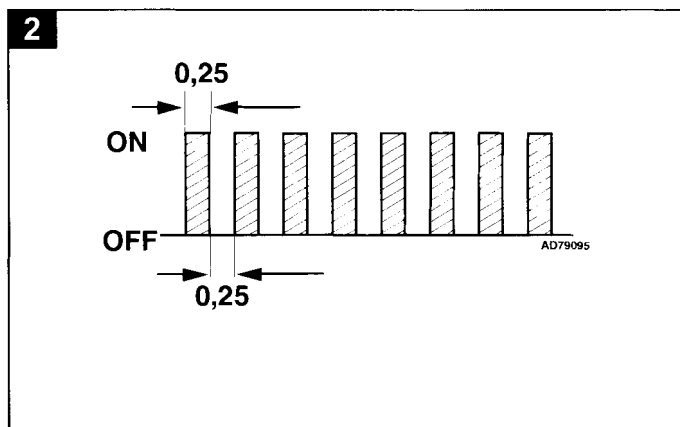
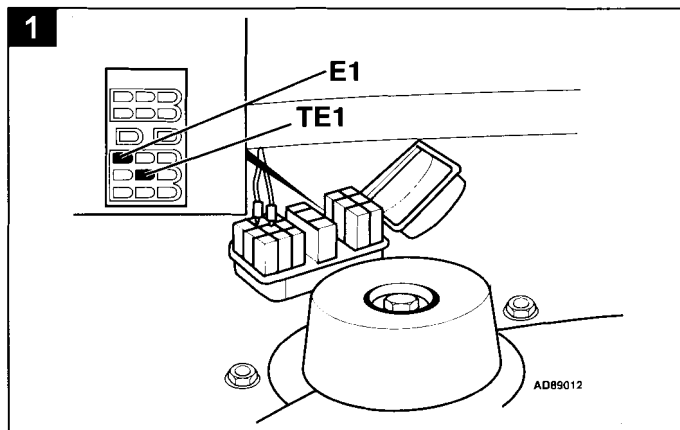
### Trouble codes

#### General information

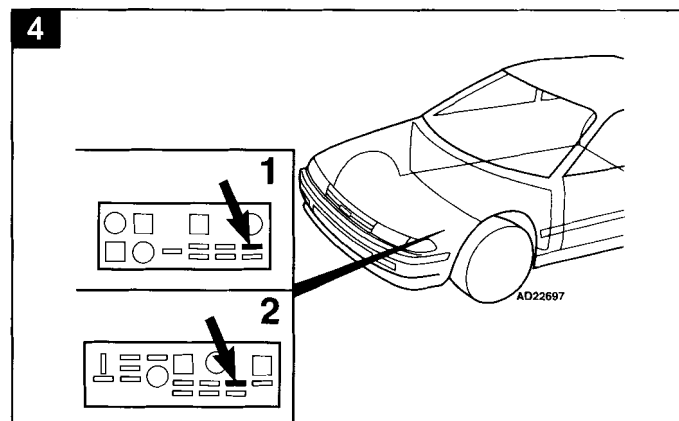
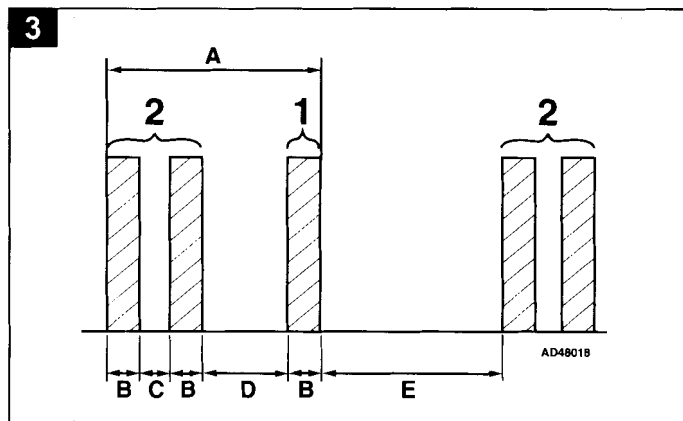
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

#### Accessing

- Switch ignition ON.
- Bridge data link connector (DLC) terminals E1 and TE1 **1**.
- If no trouble codes are stored, the lamp will flash twice per second **2**.
- Each trouble code consists of two groups of one or more flashes **3** [A].
- Warning lamp flash duration: 0,5 second **3** [B].
- A 0,5 second pause separates each flash **3** [C].
- A 1,5 second pause separates each trouble code group **3** [D].
- A 2,5 second pause separates each trouble code **3** [E].
- For example: Two 0,5 second flashes – 1,5 second pause – one 0,5 second flash. Trouble code 21 displayed **3** – heated oxygen sensor (HO2S).
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.







### Erasing

**NOTE:** Fuse removal duration depends on ambient temperature.  
The lower the temperature the longer the fuse must be removed.

- Switch ignition OFF.
- Remove EFI fuse (15A) from underbonnet fusebox for 10 seconds minimum **4** [2].
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.

### Trouble code identification

Flash type	Fault location	Probable cause
11111	No fault found	–
11	Engine control module (ECM) – supply voltage	Wiring, engine control relay, ECM
12	Camshaft position (CMP) sensor, crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal	Wiring, CMP sensor, CKP/RPM sensor, ignition amplifier, ECM
13	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal over 1000 rpm	Wiring, CKP/RPM sensor, ECM
14	Ignition signal – no signal	Wiring, ignition amplifier, ECM
21	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
22	Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
25	Weak mixture	Wiring, air leak, ignition system, fuel pressure, injector, VAF/MAP sensor, HO2S, ECM
26	Rich mixture	Wiring, air leak, ignition system, fuel pressure, injector, cold start injector, VAF/MAP sensor, HO2S, ECM
31	4A-FE: Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
	3S-FE: Volume air flow (VAF) sensor – circuit	Wiring, VAF sensor, ECM



**TOYOTA**

Model: Carina II 1,6 • Carina II 2,0

**Engine management**

Flash type	Fault location	Probable cause
32	Volume air flow (VAF) sensor – circuit	Wiring, VAF sensor, ECM
41	Throttle position (TP) sensor	Wiring, TP sensor, ECM
42	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
43	Starter signal	Wiring, ignition switch, ECM
51	Switch signal – AC switch ON during diagnosis	Wiring, AC switch, AC control module, ECM
	Switch signal – PNP switch not in P or N during diagnosis	Wiring, PNP switch, ECM
	Switch signal – throttle position (TP) sensor, NO closed throttle signal during diagnosis	Wiring, TP sensor, ECM



Model: Carina E 1,6/1,8/2,0  
Carina E 2,0D • Carina E 2,0D Turbo

Year: 1992-98

Engine code: 2C, 2C-T, 4A-FE, 7A-FE, 3S-FE, 3S-GE

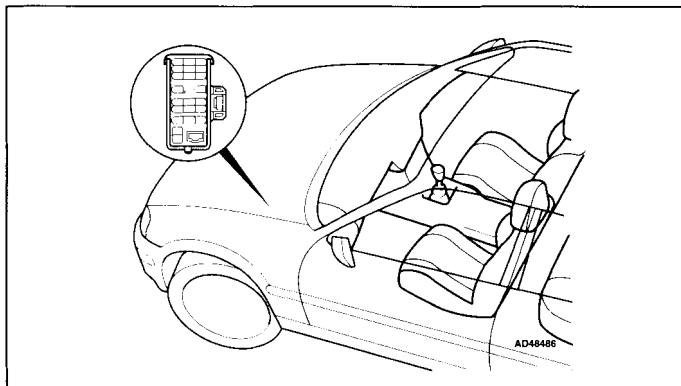
System: TCCS

**TOYOTA**



Engine management

## Data link connector (DLC) locations



Engine bay, LH

## Trouble codes

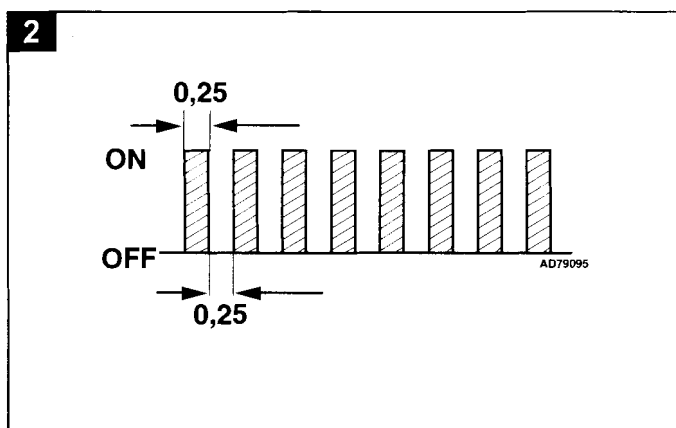
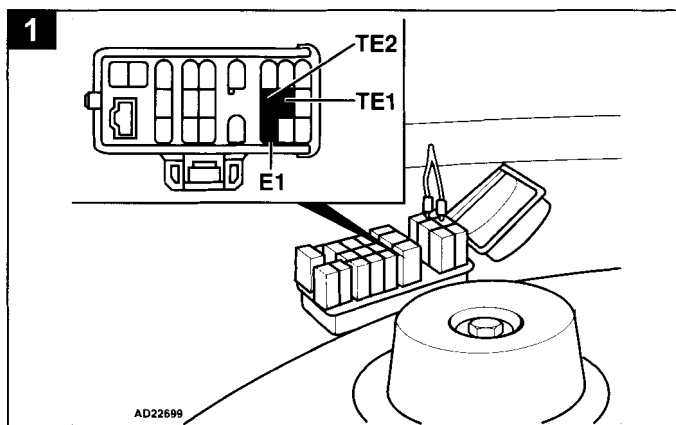
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- Some models: The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

### Accessing

#### Normal mode

- Switch ignition ON.
- Bridge data link connector (DLC) terminals E1 and TE1 **1**.
- If no trouble codes are stored, the lamp will flash twice per second **2**.
- Each trouble code consists of two groups of one or more flashes **3** [A].
- Warning lamp flash duration: 0,5 second **3** [B].
- A 0,5 second pause separates each flash **3** [C].
- A 1,5 second pause separates each trouble code group **3** [D].
- A 2,5 second pause separates each trouble code **3** [E].
- For example: Two 0,5 second flashes – 1,5 second pause – one 0,5 second flash. Trouble code 21 displayed **3** – heated oxygen sensor (HO2S).
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.

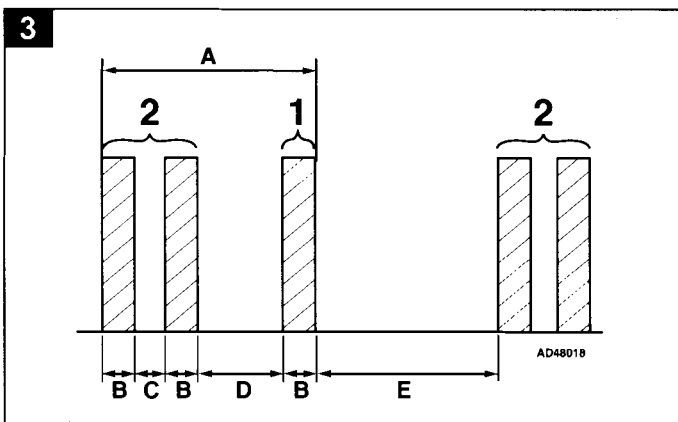




# TOYOTA

Model: Carina E 1,6/1,8/2,0 • Carina E 2,0D • Carina E 2,0D Turbo

## Engine management



### Test mode

- Switch ignition OFF.
- Bridge data link connector (DLC) terminals E1 and TE2 **1**.
- Switch ignition ON.
- Ensure malfunction indicator lamp (MIL) flashes four times per second.
- Start engine.
- Drive vehicle at over 6 mph (10 km/h).
- Stop vehicle. Do not switch ignition OFF.
- With data link connector (DLC) terminals E1 and TE2 bridged, bridge terminals E1 and TE1 **1**.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.
- Remove bridge wires.
- Rectify faults as necessary.

**NOTE:** Codes 42 and 43 may be produced if this procedure is NOT carried out correctly. Code 51 will be produced during this procedure and can be ignored.

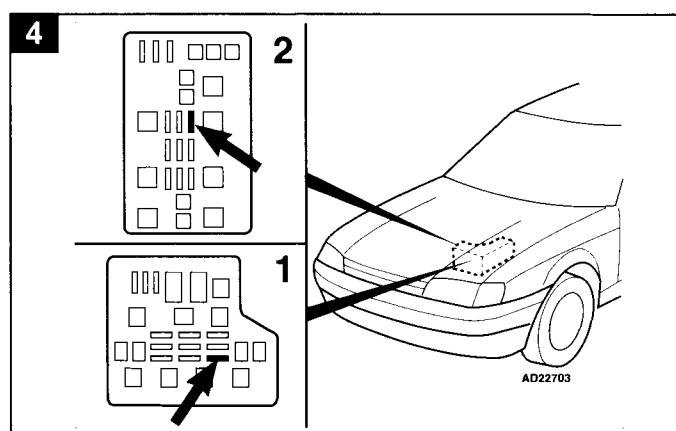
### Erasing

**NOTE:** Fuse removal duration depends on ambient temperature. The lower the temperature the longer the fuse must be removed.

- Switch ignition OFF.
- Remove EFI fuse (15/20A) from underbonnet fusebox for 10 seconds minimum. 1,6/1,8: **4** [1]. 2,0: **4** [2].
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.



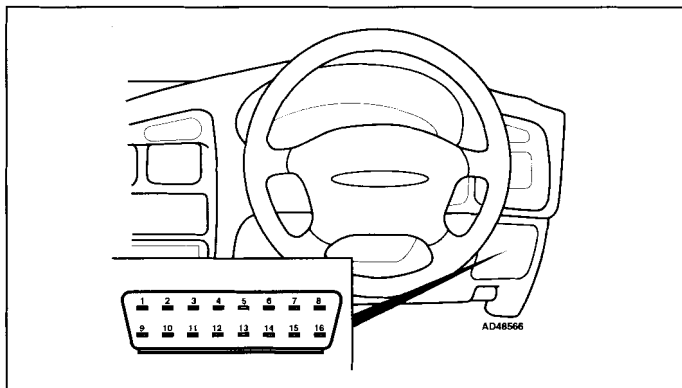
### Trouble code identification

Flash type	Fault location	Probable cause
11111	No fault found	—
11	Engine control module (ECM) – defective	ECM
12	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – no signal	Wiring, CKP/CMP sensor, ECM
13	Crankshaft position (CKP) sensor – no signal over idle	Wiring, CKP sensor, ECM
14	Ignition signal – no signal	Wiring, ignition amplifier, ECM
16	Transmission control signal	Wiring, ECM
18	Supply voltage low/high	Wiring, battery, alternator, ECM
21	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
22	Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM



Flash type	Fault location	Probable cause
25	Weak mixture	Wiring, air leak, fuel pressure, injector, MAP sensor, HO2S, ignition system, ECM
31	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
33	Idle air control (IAC) valve	Wiring, IAC valve, ECM
41	Throttle position (TP) sensor	Wiring, TP sensor, ECM
42	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
43	Starter signal	Wiring, ignition switch, ECM
51	Switch signal – AC switch ON during diagnosis	Wiring, AC switch, AC control module, ECM
	Switch signal – PNP switch not in P or N during diagnosis	Wiring, PNP switch, ECM
	Switch signal – throttle position (TP) sensor, NO closed throttle signal during diagnosis	Wiring, TP sensor, ECM
52	Knock sensor (KS)	Wiring, KS, ECM
53	Knock control – malfunction	ECM
99	Immobilizer control system – malfunction	Wiring, immobilizer read coil amplifier, immobilizer read coil, immobilizer control module, ECM



**Data link connector (DLC) locations**

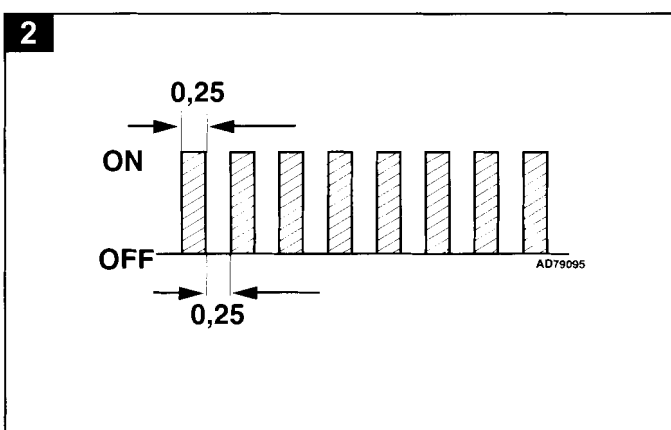
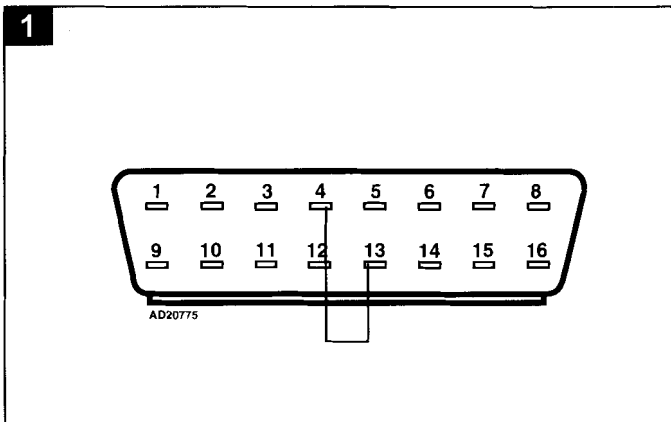
Fascia

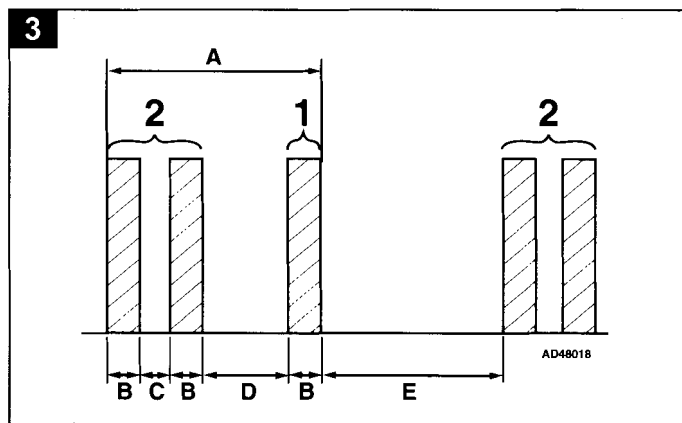
**Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- More detailed fault diagnosis information can be obtained using diagnostic equipment connected to the data link connector (DLC).

**Accessing****Normal mode**

- Switch ignition ON.
- Bridge data link connector (DLC) terminals 4 and 13 **1**.
- If no trouble codes are stored, the lamp will flash twice per second **2**.
- Each trouble code consists of two groups of one or more flashes **3** [A].
- Warning lamp flash duration: 0,5 second **3** [B].
- A 0,5 second pause separates each flash **3** [C].
- A 1,5 second pause separates each trouble code group **3** [D].
- A 2,5 second pause separates each trouble code **3** [E].
- For example: Two 0,5 second flashes – 1,5 second pause – one 0,5 second flash. Trouble code 21 displayed **3** – heated oxygen sensor (HO2S).
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.



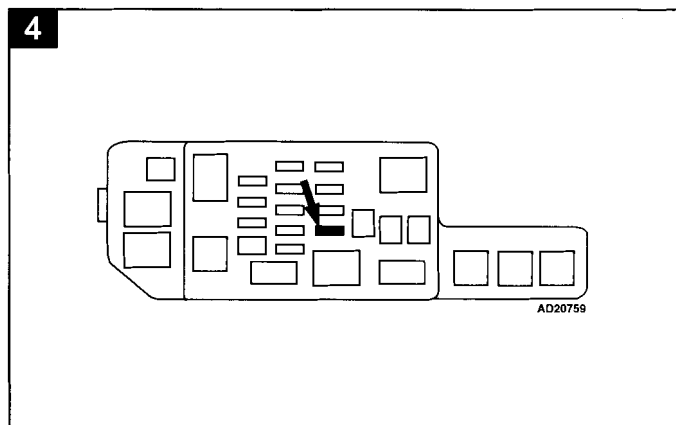


### Erasing

- Ensure ignition switched OFF.
- Remove EFI fuse (15A) from underbonnet fusebox for 10 seconds minimum **4**.
- Refit fuse.
- Diagnostic equipment can also be used to erase data from ECM fault memory.

- Repeat accessing procedure to ensure trouble codes erased.
- Trouble codes may also be erased by disconnecting battery leads.

**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).



### Trouble code identification

Flash type	B/P type	Fault location	Probable cause
–	P0	Refer to EOBD trouble code table	–
11111	–	No fault found	–
12 <b>1</b>	–	Crankshaft position (CKP) sensor/ camshaft position (CMP) sensor – circuit malfunction	Wiring, CKP sensor, CMP sensor, ECM
12 <b>2</b>	–	Crankshaft position (CKP) sensor – circuit malfunction	Wiring, CKP sensor, ECM
12 <b>3</b>	–	Camshaft position (CMP) sensor – circuit malfunction	Wiring, CMP sensor, camshaft sprocket, ECM
13 <b>1</b>	P1335	Crankshaft position (CKP) sensor – circuit malfunction during idling	Wiring, CKP sensor, starter, ECM
13 <b>2</b>	–	Fuel injection pump position sensor – circuit malfunction during idling	Wiring, fuel injection pump position sensor, ECM
13 <b>3</b>	–	Crankshaft position (CKP) sensor – circuit malfunction	Wiring, CKP sensor, crankshaft sprocket, ECM
14 <b>1</b>	P1300	Ignition coil/amplifier 1 – malfunction	Wiring, ignition coil/amplifier, ECM
14 <b>2</b>	–	Timing control system – malfunction	Wiring, fuel filter, fuel injection timing solenoid, fuel injection pump, ECM
15 <b>1</b>	P1310	Ignition coil/amplifier 2 – malfunction	Wiring, ignition coil/amplifier, ECM
15 <b>3</b>	–	Throttle motor – circuit malfunction	Wiring, throttle motor, throttle body, ECM
16	–	Transmission control signal	Wiring, ECM
17	–	Engine control module (ECM) – malfunction	ECM
18	–	Fuel quantity adjuster – malfunction	Wiring, fuel quantity adjuster, ECM

**TOYOTA**

Model: Avensis 1,6/1,8/2,0 • Avensis 2,0D Turbo

**Engine management**

Flash type	B/P type	Fault location	Probable cause
19	–	Accelerator pedal position (APP) sensor/switch – circuit malfunction	Wiring, accelerator pedal position (APP) sensor/switch, ECM
21	–	Heated oxygen sensor (HO2S) 1, bank 1 – circuit malfunction	Wiring, HO2S, ECM
22	–	Engine coolant temperature (ECT) sensor – circuit malfunction	Wiring, ECT sensor, ECM
24	–	Intake air temperature (IAT) sensor – circuit malfunction	Wiring, IAT sensor, ECM
25	–	System too lean, bank 1	Air leak, fuel pressure, wiring, injector, HO2S, MAP sensor, ECT sensor, ECM
26	–	System too rich, bank 1	Fuel pressure, wiring, injector, HO2S, MAP sensor, ECT sensor, ECM
31 ■	–	Manifold absolute pressure (MAP) sensor – circuit malfunction	Wiring, MAP sensor, ECM
31 ■ 3	–	Mass air flow (MAF) sensor – circuit malfunction	Wiring, MAF sensor, ECM
32 ■ 2	–	Module coding plug – malfunction	Wiring, module coding plug, ECM
32 ■ 3	–	Injector – malfunction	Wiring, injector, ECM
33 ■ 1	–	Idle speed control (ISC) system – malfunction	Wiring, IAC valve, ECM
33 ■ 2	–	Intake manifold air control solenoid 2 – malfunction	Wiring, intake manifold air control solenoid 2, ECM
35	–	Manifold absolute pressure (MAP) sensor, TC system – circuit malfunction	Wiring, MAP sensor, MAP sensor control solenoid, hoses blocked/disconnected, ECM
39	–	Fuel temperature sensor – circuit malfunction	Wiring, fuel temperature sensor, ECM
41	–	Throttle position (TP) sensor – circuit malfunction	Wiring, TP sensor, ECM
42	–	Vehicle speed sensor (VSS) – circuit malfunction	Wiring, speedometer, VSS, ECM
49	–	Fuel pressure sensor – circuit malfunction	Wiring, fuel pressure sensor, ECM
52	–	Knock sensor (KS) 1, bank 1 – circuit malfunction	Wiring, KS, ECM
53	P1605	Engine control module (ECM), knock control – defective	ECM
78	–	Fuel circuit – malfunction	Wiring, injector control module, injector, fuel pressure sensor, suction control valve, high pressure fuel pump, high pressure fuel pump control solenoids, fuel lines, ECM
96	P1600	Engine control module (ECM) – supply	Wiring, engine control relay, ECM
97	–	Injector control module – circuit malfunction	Wiring, injector control module, high pressure fuel pump control solenoids, injector, ECM
99	B2799	Immobilizer control system – malfunction	Wiring, immobilizer read coil amplifier, immobilizer read coil, immobilizer control module, ECM

■ 1 3S-FE/4A-FE/7A-FE

■ 2 2C-TE

■ 3 1CD-FTV





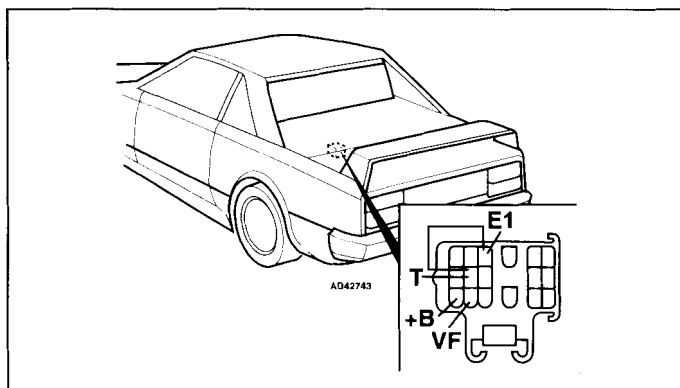
Model: MR2 1,6 • MR2 2,0  
 Year: 1985-00  
 Engine code: 3S-FE, 3S-GE, 4A-GE  
 System: TCCS

**TOYOTA**

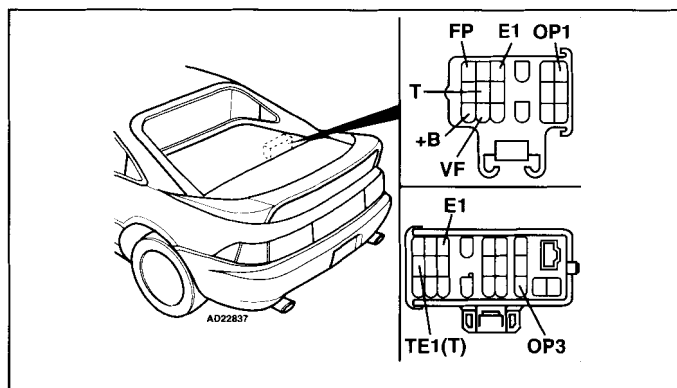


Engine management

## Data link connector (DLC) locations



→1990



1990 →

## Trouble codes

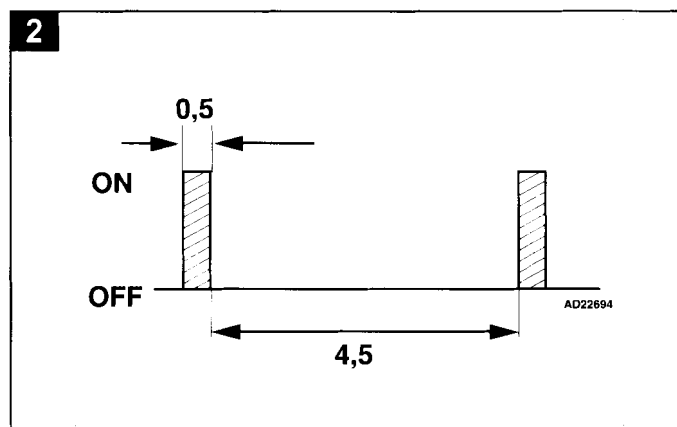
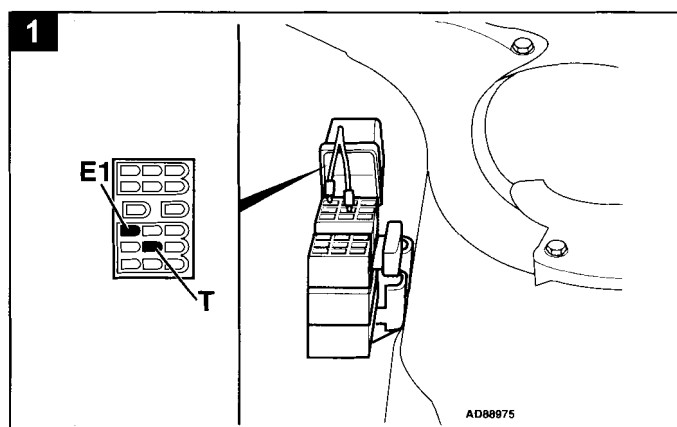
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).

### Accessing

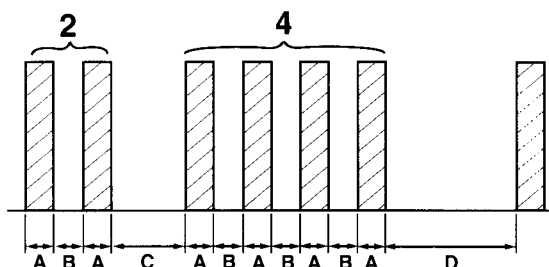
#### 4A-GE – without airflow meter

- Switch ignition ON.
- Bridge data link connector (DLC) terminals E1 and TE1 (T) **1**.
- If no trouble codes are stored, the lamp will flash once every 4,5 seconds **2**.
- Individual short flashes display trouble code **3**.
- Warning lamp flash duration: 0,5 second **3** [A].
- A 0,5 second pause separates each flash **3** [B].
- A 2,5 second pause separates each trouble code **3** [C].
- For example: Trouble codes 2 and 4 displayed **3**.
- Trouble codes are repeated 4,5 seconds after last trouble code **3** [D].
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.
- Remove bridge wire.
- Rectify faults as necessary.



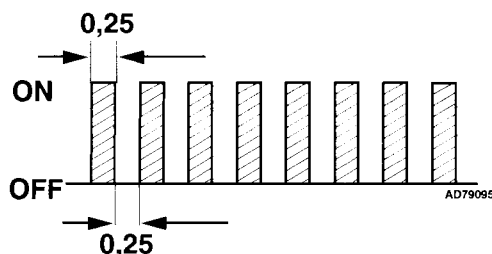


3



AD22696

5

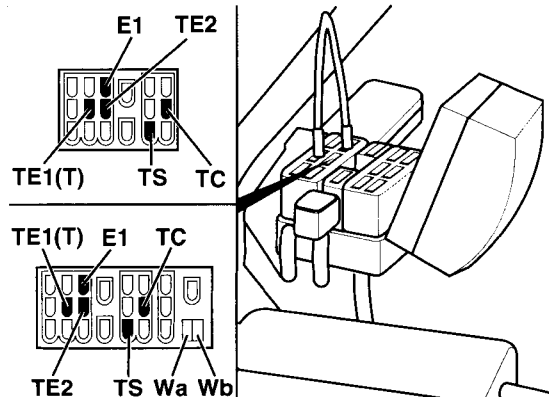


### 3S-FE/3S-GE

#### Normal mode

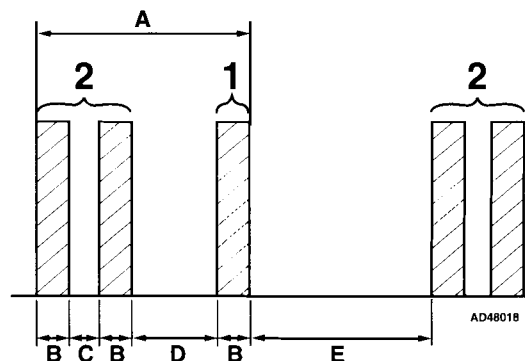
- Switch ignition ON.
- Bridge data link connector (DLC) terminals E1 and TE1 (T).  
→1990: **1**. 1990→: **4**.
- If no trouble codes are stored, the lamp will flash twice per second **5**.
- Each trouble code consists of two groups of one or more flashes **6** [A].
- Warning lamp flash duration: 0,5 second **6** [B].
- A 0,5 second pause separates each flash **6** [C].
- A 1,5 second pause separates each trouble code group **6** [D].
- A 2,5 second pause separates each trouble code **6** [E].
- For example: Two 0,5 second flashes – 1,5 second pause – one 0,5 second flash. Trouble code 21 displayed **6** – heated oxygen sensor (HO2S).
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.

4



AD22836

6



AD48018

#### Test mode 1994→

- Switch ignition OFF.
- Bridge data link connector (DLC) terminals E1 and TE2 **4**.
- Switch ignition ON.
- Ensure malfunction indicator lamp (MIL) flashes four times per second.
- Start engine.
- Drive vehicle at over 6 mph (10 km/h) to meet conditions of customer complaint.
- Stop vehicle. Do not switch ignition OFF.
- With data link connector (DLC) terminals E1 and TE2 bridged, bridge terminals E1 and TE1 **4**.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.
- Remove bridge wires.
- Rectify faults as necessary.

**NOTE:** Codes 42 and 43 may be produced if this procedure is NOT carried out correctly. Code 51 will be produced during this procedure and can be ignored.



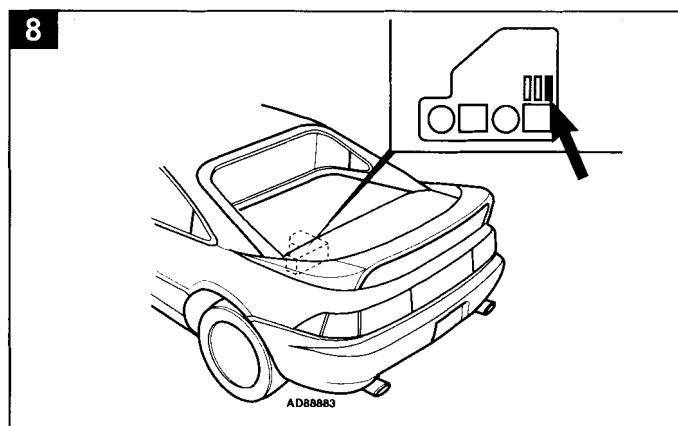
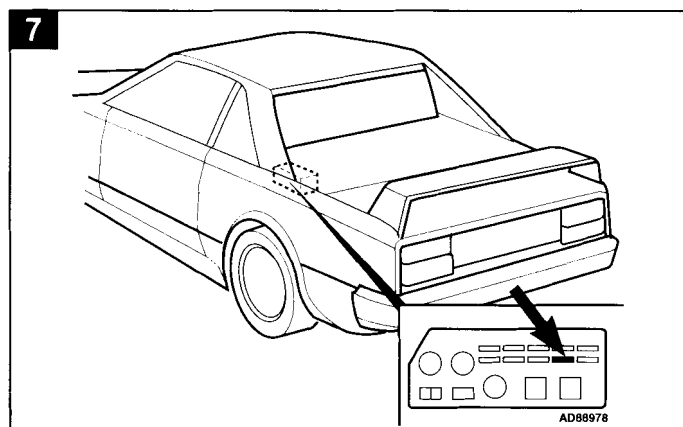
## Erasing

**NOTE:** Fuse removal duration depends on ambient temperature. The lower the temperature the longer the fuse must be removed.

- Switch ignition OFF.
- →1990: Remove AM2 fuse (7,5A) from underbonnet fusebox for 10 seconds minimum **7**.
- 1990 →: Remove EFI fuse (15A) from underbonnet fusebox for 10 seconds minimum **8**.
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.



## Trouble code identification

### 4A-GE – with manifold absolute pressure (MAP) sensor

Flash type	Fault location	Probable cause
1	No fault found	–
2	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
3	Ignition amplifier – signal	Wiring, ignition amplifier, ECM
4	Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
6	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal	Wiring, CKP/RPM sensor, ignition amplifier, ECM
7	Throttle position (TP) sensor – open/short circuit	Wiring, TP sensor, ECM
8	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
9	Vehicle speed sensor (VSS) – signal	Wiring, VSS, ECM
10	Starter signal	Wiring, ignition switch, ECM
11	Switch signal – AC switch ON during diagnosis	Wiring, AC switch, AC control module, ECM
	Switch signal – PNP switch not in P or N during diagnosis	Wiring, PNP switch, ECM
	Switch signal – throttle position (TP) sensor, NO closed throttle signal during diagnosis	Wiring, TP sensor, ECM

**TOYOTA**

Model: MR2 1,6 • MR2 2,0

**Engine management****3S-FE/3S-GE and 4A-GE – with volume airflow (VAF) sensor**

Flash type	Fault location	Probable cause
11111	No fault found	–
12	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – no signal	Wiring, CKP/CMP sensor, ignition amplifier, ECM
13	Crankshaft position (CKP) sensor – no signal over idle	Wiring, CKP sensor, ignition amplifier, ECM
14	Ignition signal – no signal	Wiring, ignition amplifier, ECM
16	Transmission control signal	Wiring, ECM
21	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
22	Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
25	Weak mixture	Wiring, air leak, ignition system, fuel pressure, injector, VAF sensor, ECT sensor, IAT sensor, O2S/HO2S, ECM
26	Rich mixture	Wiring, ignition system, fuel pressure, injector, cold start injector, VAF sensor, ECT sensor, IAT sensor, O2S/HO2S, ECM
31	Manifold absolute pressure (MAP) sensor – circuit	Wiring, MAP sensor, ECM
	Volume air flow (VAF) sensor – circuit	Wiring, VAF sensor, ECM
32	Volume air flow (VAF) sensor	Wiring, VAF sensor, ECM
41	Throttle position (TP) sensor	Wiring, TP sensor, ECM
42	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
43	Starter signal	Wiring, ignition switch, ECM
51	Switch signal – AC switch ON during diagnosis	Wiring, AC switch, AC control module, ECM
	Switch signal – PNP switch not in P or N during diagnosis	Wiring, PNP switch, ECM
	Switch signal – throttle position (TP) sensor, NO closed throttle signal during diagnosis	Wiring, TP sensor, ECM
52	Knock sensor (KS)	Wiring, KS, ECM
53	Knock control – malfunction	ECM
99	Immobilizer control system – malfunction	Wiring, immobilizer read coil amplifier, immobilizer read coil, immobilizer control module, ECM



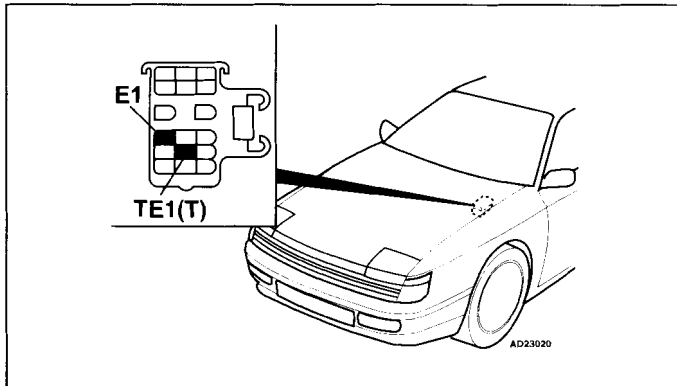
Model: Celica 1,6 • Celica 1,8 • Celica 2,0  
 Year: 1985-99  
 Engine code: 4A-GE, 4A-FE, 7A-FE, 3S-GE, 3S-GTE  
 System: TCCS

**TOYOTA**

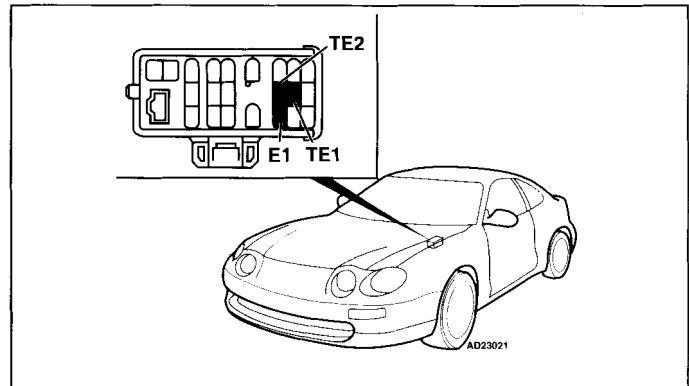


Engine management

## Data link connector (DLC) locations



1985-94 – engine bay, LH



1994-99 – engine bay, LH

## Trouble codes

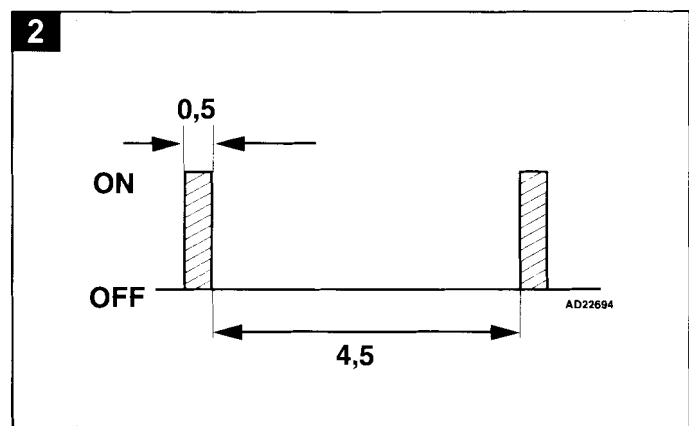
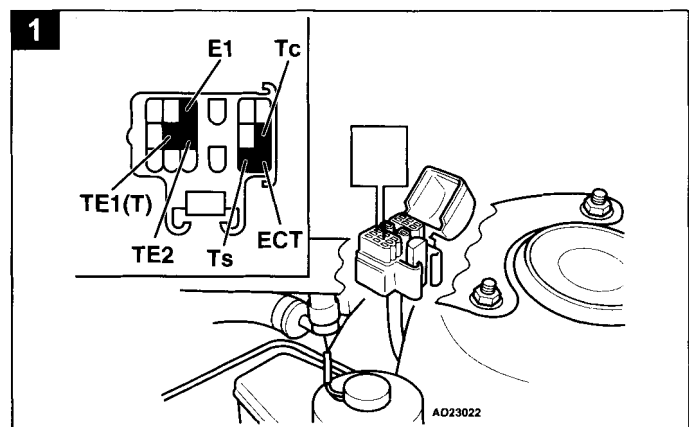
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).

### Accessing

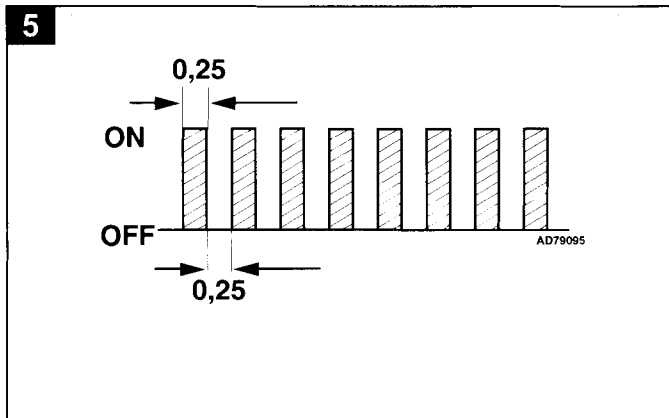
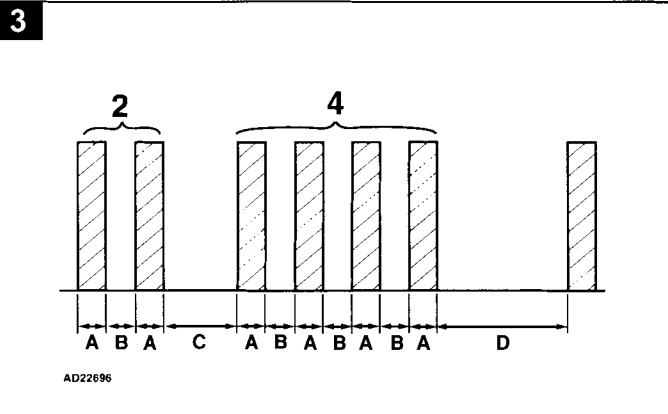
#### 4A-GE 1985-90 – with manifold absolute pressure (MAP) sensor

- Switch ignition ON.
- Bridge data link connector (DLC) terminals E1 and TE1 (T) **1**.
- If no trouble codes are stored, the lamp will flash once every 4,5 seconds **2**.
- Individual short flashes display trouble code **3**.
- Warning lamp flash duration: 0,5 second **3** [A].
- A 0,5 second pause separates each flash **3** [B].
- A 2,5 second pause separates each trouble code **3** [C].
- For example: Trouble codes 2 and 4 displayed **3**.
- Trouble codes are repeated 4,5 seconds after last trouble code **3** [D].
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.
- Remove bridge wire.
- Rectify faults as necessary.





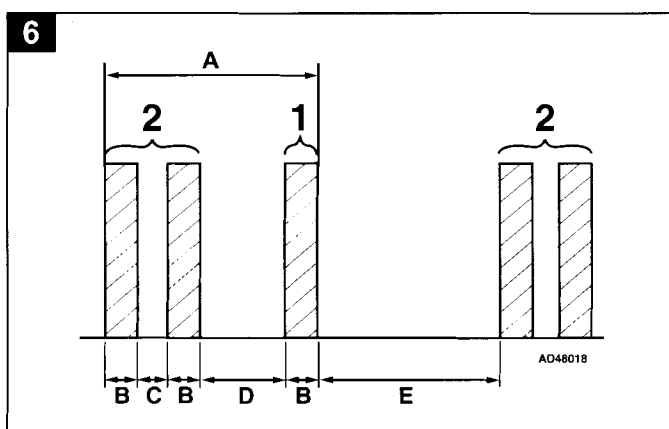
## Engine management



Except 4A-GE 1985-90 – with manifold absolute pressure (MAP) sensor

### Normal mode

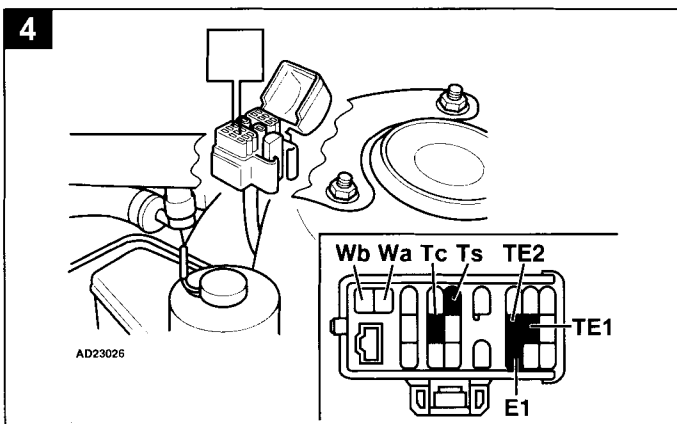
- Switch ignition ON.
- Bridge data link connector (DLC) terminals E1 and TE1 (T).  
→1994: **1**. 1994 →: **4**.
- If no trouble codes are stored, the lamp will flash twice per second **5**.
- Each trouble code consists of two groups of one or more flashes **6** [A].
- Warning lamp flash duration: 0,5 second **6** [B].
- A 0,5 second pause separates each flash **6** [C].
- A 1,5 second pause separates each trouble code group **6** [D].
- A 2,5 second pause separates each trouble code **6** [E].
- For example: Two 0,5 second flashes – 1,5 second pause – one 0,5 second flash. Trouble code 21 displayed **6** – heated oxygen sensor (HO2S).
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.



### Test mode 1992 →

- Switch ignition OFF.
- Bridge data link connector (DLC) terminals E1 and TE2.  
→1994: **1**. 1994 →: **4**.
- Switch ignition ON.
- Ensure malfunction indicator lamp (MIL) flashes four times per second.
- Start engine.
- Drive vehicle at over 6 mph (10 km/h) to meet conditions of customer complaint.
- Stop vehicle. Do not switch ignition OFF.
- With data link connector (DLC) terminals E1 and TE2 bridged, bridge terminals E1 and TE1 **4**.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.
- Remove bridge wires.
- Rectify faults as necessary.

**NOTE:** Codes 42 and 43 may be produced if this procedure is NOT carried out correctly. Code 51 will be produced during this procedure and can be ignored.





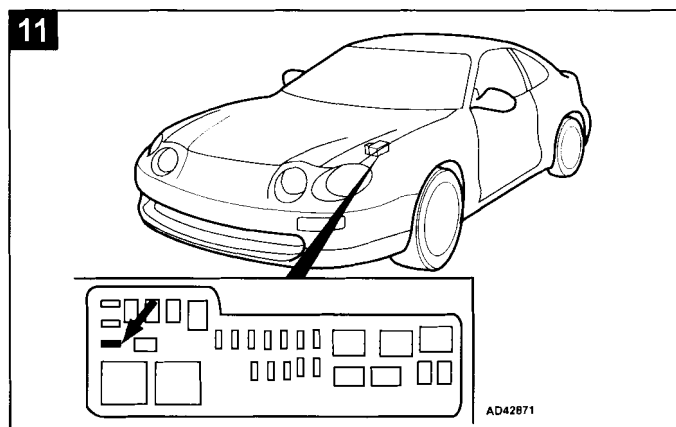
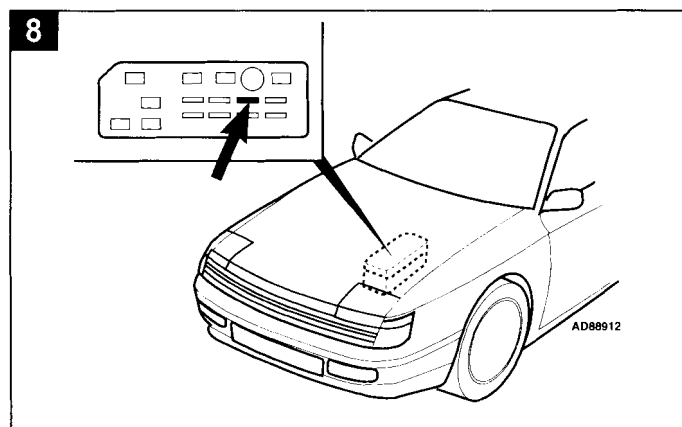
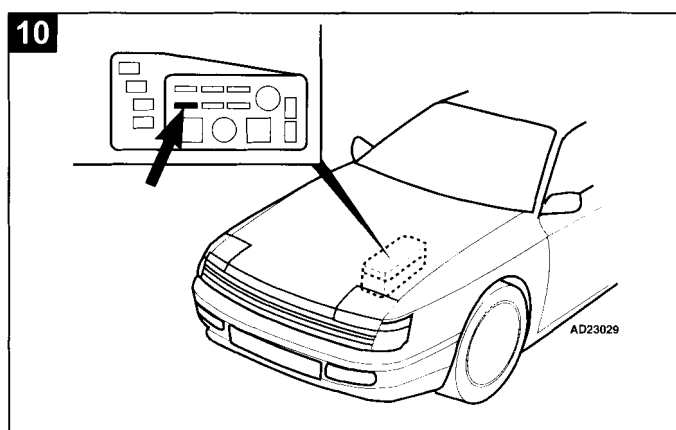
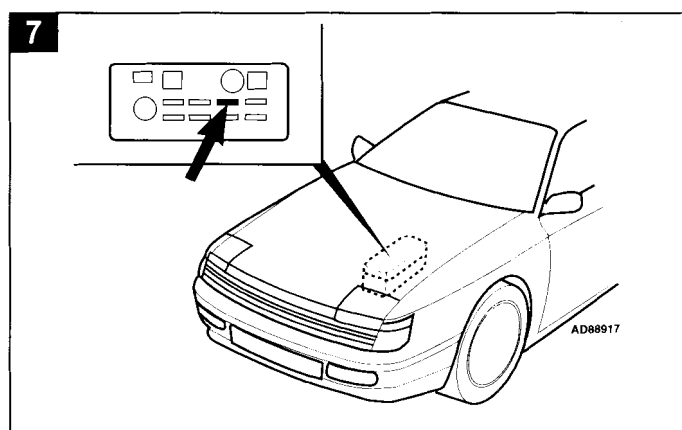
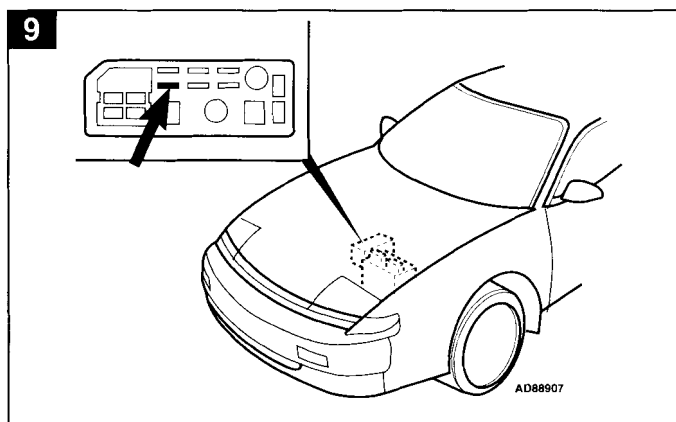
## Erasing

**NOTE:** Fuse removal duration depends on ambient temperature.  
The lower the temperature the longer the fuse must be removed.

- Switch ignition OFF.
- Remove EFI fuse (15A) from underbonnet fusebox for 10 seconds minimum. 1985-90 except 3S-GTE: **7**. 1985-90 3S-GTE: **8**. 1990-94 4A-FE/3S-GE: **9**. 1990-94 3S-GTE: **10**. 1994-99: **11**.
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.



**TOYOTA**

Model: Celica 1,6 • Celica 1,8 • Celica 2,0

**Engine management****Trouble code identification****4A-GE 1985-90 – with manifold absolute pressure (MAP) sensor**

Flash type	Fault location	Probable cause
1	No fault found	–
2	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
3	Ignition amplifier – signal	Wiring, ignition amplifier, ECM
4	Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
6	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal	Wiring, CKP/RPM sensor, ignition amplifier, ECM
7	Throttle position (TP) sensor – open/short circuit	Wiring, TP sensor, ECM
8	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
9	Vehicle speed sensor (VSS) – signal	Wiring, VSS, ECM
10	Starter signal	Wiring, ignition switch, ECM
11	Switch signal – AC switch ON during diagnosis	Wiring, AC switch, AC control module, ECM
	Switch signal – PNP switch not in P or N during diagnosis	Wiring, PNP switch, ECM
	Switch signal – throttle position (TP) sensor, NO closed throttle signal during diagnosis	Wiring, TP sensor, ECM

**Except 4A-GE 1985-90 – with manifold absolute pressure (MAP) sensor**

Flash type	Fault location	Probable cause
11111	No fault found	–
11	Engine control module (ECM) – power supply	Wiring, ignition switch, engine control relay, ECM
12	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – no signal	Wiring, CKP/CMP sensor, ignition amplifier, ECM
13	Crankshaft position (CKP) sensor – no signal over idle	Wiring, CKP sensor, ignition amplifier, ECM
14	Ignition signal – no signal	Wiring, ignition amplifier, ECM
16	Transmission control signal	Wiring, ECM
21	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
22	Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
25	Weak mixture	Wiring, air leak, ignition system, fuel pressure, injector, VAF sensor, ECT sensor, IAT sensor, O2S/HO2S, ECM
26	Rich mixture	Wiring, ignition system, fuel pressure, injector, cold start injector, VAF sensor, ECT sensor, IAT sensor, O2S/HO2S, ECM
31	Manifold absolute pressure (MAP) sensor – circuit	Wiring, MAP sensor, ECM
	Volume air flow (VAF) sensor – circuit	Wiring, VAF sensor, ECM





Flash type	Fault location	Probable cause
32	Volume air flow (VAF) sensor	Wiring, VAF sensor, ECM
33	Idle air control (IAC) valve	Wiring, IAC valve, ECM
34	Turbocharger (TC) pressure – high	Wiring, turbocharger, MAP sensor, ECM
35	Manifold absolute pressure (MAP) sensor, TC system – signal	Wiring, MAP sensor, ECM
41	Throttle position (TP) sensor	Wiring, TP sensor, ECM
42	Vehicle speed sensor (VSS)	Wiring, VSS, ECM
43	Starter signal	Wiring, ignition switch, ECM
51	Switch signal – AC switch ON during diagnosis	Wiring, AC switch, AC control module, ECM
	Switch signal – PNP switch not in P or N during diagnosis	Wiring, PNP switch, ECM
	Switch signal – throttle position (TP) sensor, NO closed throttle signal during diagnosis	Wiring, TP sensor, ECM
52	Knock sensor (KS)	Wiring, KS, ECM
53	Knock control – malfunction	ECM
54	Turbocharger intercooler module – signal	Wiring, coolant circuit, turbocharger intercooler coolant pump, turbocharger intercooler coolant level sensor, turbocharger intercooler module/relay, ECM
99	Immobilizer control system – malfunction	Wiring, immobilizer read coil amplifier, immobilizer read coil, immobilizer control module, ECM



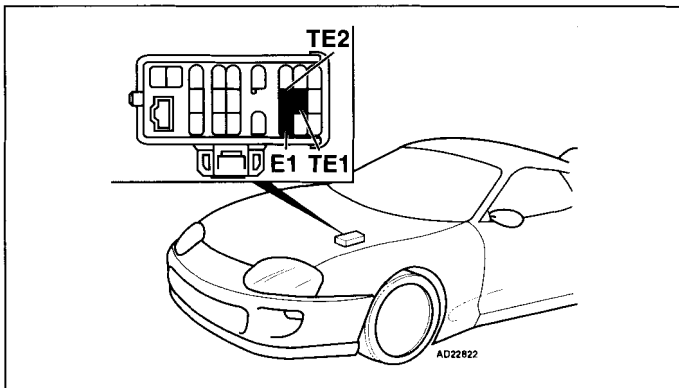


# TOYOTA

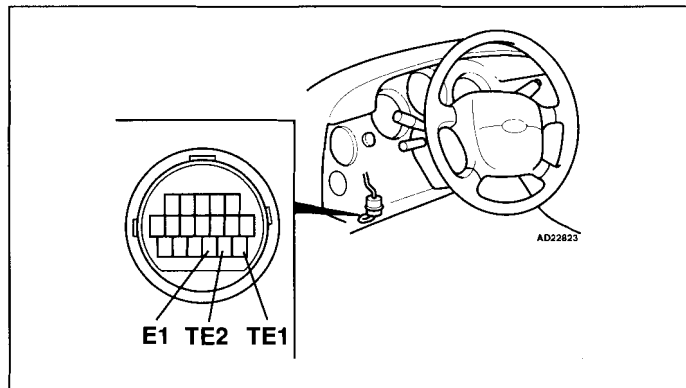
Model: Supra 3,0/Turbo  
 Year: 1993-97  
 Engine code: 2JZ-GTE, 7M-GE, 7M-GTE  
 System: TCCS

## Engine management

### Data link connector (DLC) locations



Type 1 – engine bay, LH



Type 2 – under fascia, driver's side

### Trouble codes

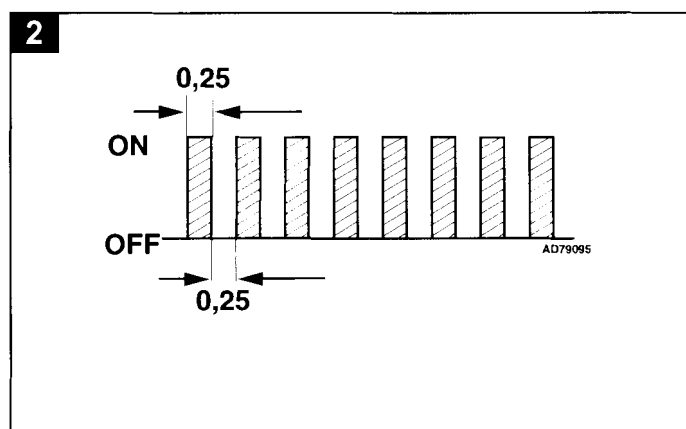
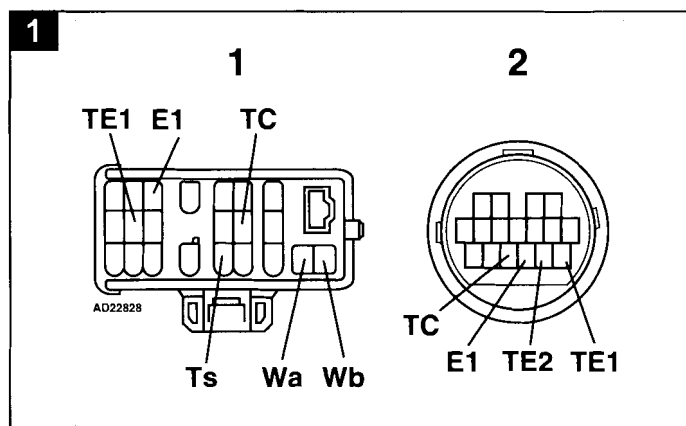
#### General information

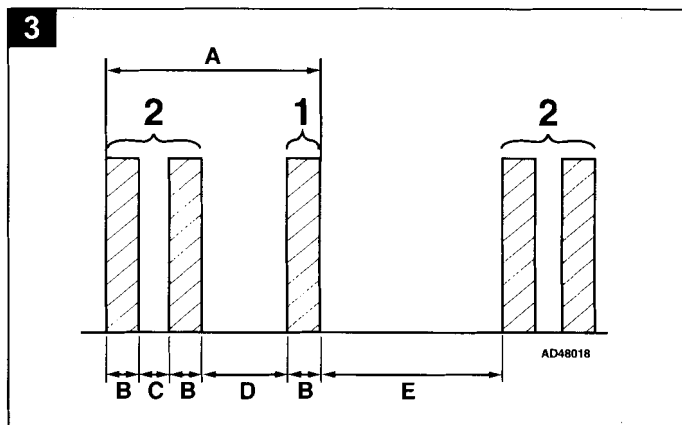
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).

#### Accessing

##### Normal mode

- Switch ignition ON.
- Bridge data link connector (DLC) terminals E1 and TE1 **1** [1] or [2].
- If no trouble codes are stored, the lamp will flash twice per second **2**.
- Each trouble code consists of two groups of one or more flashes **3** [A].
- Warning lamp flash duration: 0,5 second **3** [B].
- A 0,5 second pause separates each flash **3** [C].
- A 1,5 second pause separates each trouble code group **3** [D].
- A 2,5 second pause separates each trouble code **3** [E].
- For example: Two 0,5 second flashes – 1,5 second pause – one 0,5 second flash. Trouble code 21 displayed **3** – heated oxygen sensor (HO2S) 1.
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.



**Test mode**

- Switch ignition OFF.
- Bridge data link connector (DLC) terminals E1 and TE2 **1** [2].
- Switch ignition ON.
- Ensure malfunction indicator lamp (MIL) flashes four times per second.
- Start engine.
- Drive vehicle to meet conditions of customer complaint.
- Stop vehicle. Do not switch ignition OFF.
- With data link connector (DLC) terminals E1 and TE2 bridged, bridge terminals E1 and TE1 **1**.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.
- Remove bridge wires.
- Rectify faults as necessary.

**NOTE:** Code 43 may be produced if this procedure is NOT carried out correctly. Code 51 will be produced during this procedure and can be ignored.

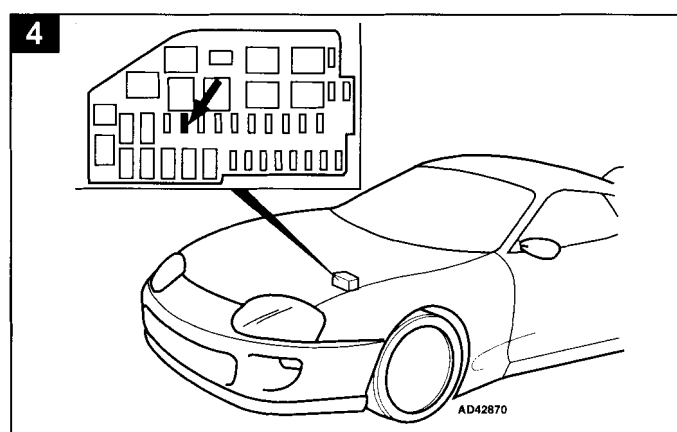
**Erasing**

**NOTE:** Fuse removal duration depends on ambient temperature. The lower the temperature the longer the fuse must be removed.

- Switch ignition OFF.
- Remove EFI no. 1 fuse (30A) from underbonnet fusebox for 10 seconds minimum **4**.
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.

**Trouble code identification**

Flash type	Fault location	Probable cause
11111	No fault found	—
12	Crankshaft position (CKP) sensor, camshaft position (CMP) sensor 1 & 2 – no signal	Wiring, CKP sensor, CMP sensor 1 & 2, starter motor, ECM
13	Crankshaft position (CKP) sensor, camshaft position (CMP) sensor 1 & 2 – no signal over 1000 rpm	Wiring, valve timing, CKP sensor, CMP sensor 1 & 2, ECM
14	Ignition signal – no signal	Wiring, ignition amplifier, ECM
16	Transmission control signal	Wiring, ECM
21	Heated oxygen sensor (HO2S) 1	Wiring, HO2S 1, ECM
22	Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
25	Weak mixture	Wiring, HO2S 1, ignition system, ECM
27	Heated oxygen sensor (HO2S) 2	Wiring, HO2S 2, ECM
31	Mass air flow (MAF) sensor – short/open circuit	Wiring, MAF sensor, ECM

**TOYOTA**

Model: Supra 3,0/Turbo

**Engine management**

Flash type	Fault location	Probable cause
34	Turbocharger (TC) pressure – high/low	Wiring, turbocharger (TC) wastegate actuator, ECM
35	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor – short/open circuit	Wiring, MAP sensor, ECM
41 <b>1</b>	Throttle position (TP) sensor 1 – short/open circuit	Wiring, TP sensor 1, ECM
42	Vehicle speed sensor (VSS) 1	Wiring, VSS 1, instrument panel, ECM
43	Starter signal	Wiring, ignition switch, ECM
47 <b>2</b>	Throttle position (TP) sensor 2 – short/open circuit	Wiring, TP sensor 2, ECM
51	Switch signal – AC switch ON during diagnosis	Wiring, AC switch, AC control module, ECM
	Switch signal – PNP switch not in P or N during diagnosis	Wiring, PNP switch, ECM
	Switch signal – throttle position (TP) sensor, NO closed throttle signal during diagnosis	Wiring, TP sensor, ECM
52	Knock sensor (KS) 1 – signal	Wiring, KS 1, ECM
53	Knock control – malfunction	ECM
55	Knock sensor (KS) 2 – signal	Wiring, KS 2, ECM
78	Fuel pump control – short/open circuit	Wiring, fuel pump control module, fuel pump, ECM

**1** Located on main throttle butterfly**2** Located on sub-throttle butterfly

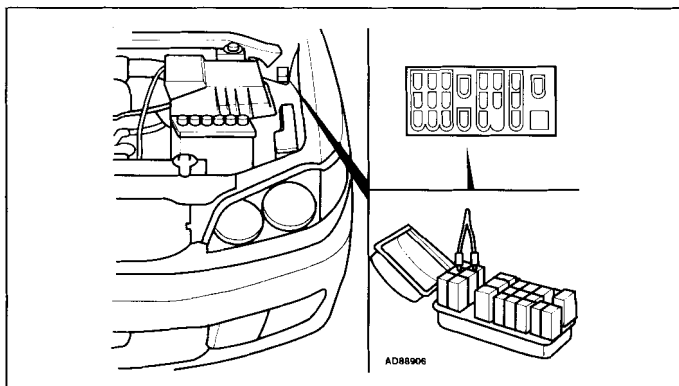
Model: Picnic 2,0 • Picnic 2,2D Turbo  
 Year: 1996-00  
 Engine code: 3C-TE, 3S-FE  
 System: TCCS

**TOYOTA**

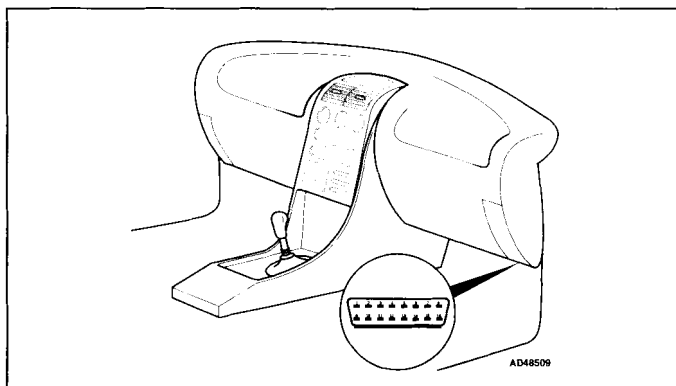


Engine management

## Data link connector (DLC) locations



Type 1 – engine bay, LH



Type 2 – under fascia, driver's side

## Trouble codes

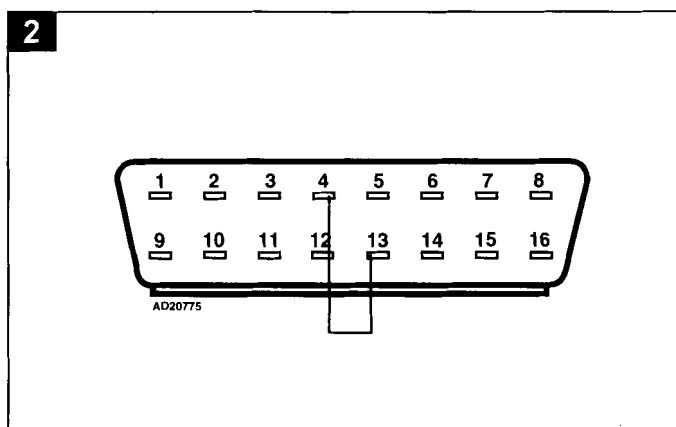
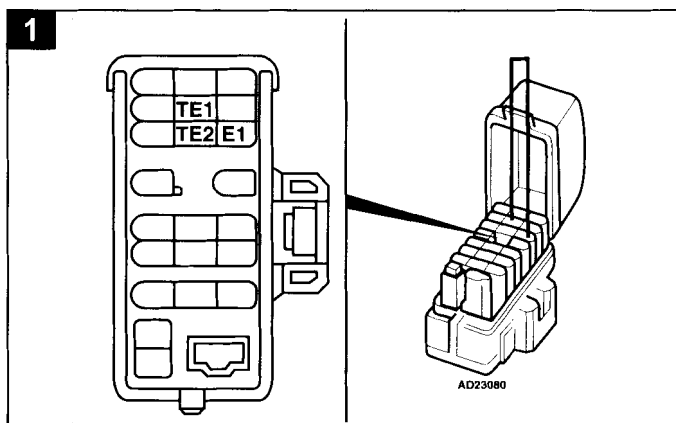
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- More detailed fault diagnosis information can be obtained using diagnostic equipment connected to the data link connector (DLC).

### Accessing

#### Normal mode

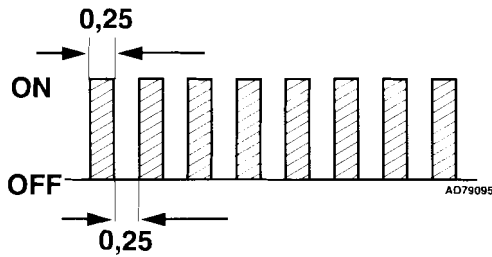
- Switch ignition ON.
- Type 1: Bridge data link connector (DLC) terminals E1 and TE1 **1**.
- Type 2: Bridge data link connector (DLC) terminals 4 and 13 **2**.
- If no trouble codes are stored, the lamp will flash twice per second **3**.
- Each trouble code consists of two groups of one or more flashes **4** [A].
- Warning lamp flash duration: 0,5 second **4** [B].
- A 0,5 second pause separates each flash **4** [C].
- A 1,5 second pause separates each trouble code group **4** [D].
- A 2,5 second pause separates each trouble code **4** [E].
- For example: Two 0,5 second flashes – 1,5 second pause – one 0,5 second flash. Trouble code 21 displayed **4** – heated oxygen sensor (HO2S).
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.





## Engine management

3



- Stop vehicle. Do not switch ignition OFF.
- With data link connector (DLC) terminals E1 and TE2 bridged, bridge terminals E1 and TE1 **1**.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.
- Remove bridge wires.
- Rectify faults as necessary.

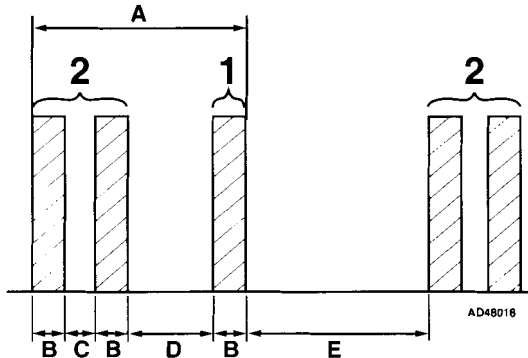
**NOTE:** Codes 42 and 43 may be produced if this procedure is NOT carried out correctly. Code 51 will be produced during this procedure and can be ignored.

### Erasing

- Ensure ignition switched OFF.
- Remove EFI fuse (15A) from underbonnet fusebox for 10 seconds minimum **5**.
- Refit fuse.
- Diagnostic equipment can also be used to erase data from ECM fault memory.
- Repeat accessing procedure to ensure trouble codes erased.
- Trouble codes may also be erased by disconnecting battery leads.

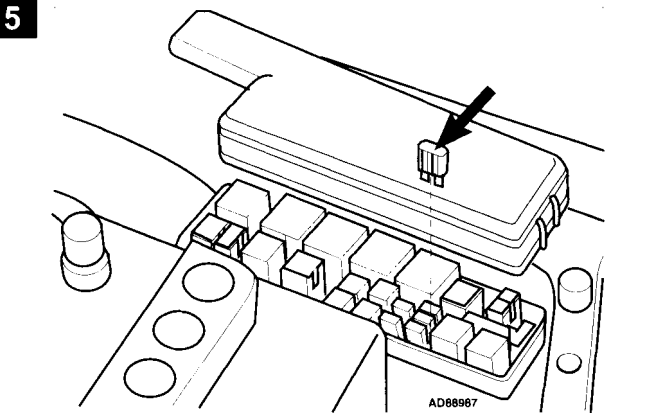
**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).

4



### Test mode – type 1

- Switch ignition OFF.
- Bridge data link connector (DLC) terminals E1 and TE2 **1**.
- Switch ignition ON.
- Ensure malfunction indicator lamp (MIL) flashes four times per second.
- Start engine.
- Drive vehicle at over 6 mph (10 km/h) to meet conditions of customer complaint.



### Trouble code identification

Flash type	Fault location	Probable cause
11111	No fault found	—
12 <b>1</b>	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – circuit malfunction	Wiring, CKP sensor, CMP sensor, ECM
12 <b>2</b>	Crankshaft position (CKP) sensor – circuit malfunction	Wiring, CKP sensor, ECM
13 <b>1</b>	Crankshaft position (CKP) sensor – no signal over 1000 rpm	Wiring, CKP sensor, ECM
13 <b>2</b>	Fuel injection pump position sensor – circuit malfunction	Wiring, fuel injection pump position sensor, ECM
14 <b>■</b>	Ignition coil/amplifier 1 – malfunction	Wiring, ignition coil/amplifier, ECM



Flash type	Fault location	Probable cause
14 <b>2</b>	Timing control system – malfunction	Wiring, fuel filter, fuel injection timing solenoid, fuel injection pump, ECM
15 <b>1</b>	Ignition coil/amplifier 2 – malfunction	Wiring, ignition coil/amplifier, ECM
15 <b>2</b>	Throttle control circuit – malfunction	Wiring, EGR throttle control valve, TP sensor, EGR throttle control actuator, throttle body, vacuum hose blocked/disconnected, ECM
16	Transmission control signal	Wiring, ECM
17	Engine control module (ECM) – malfunction	ECM
18	Fuel quantity adjuster – malfunction	Wiring, fuel quantity adjuster, ECM
19	Accelerator pedal position (APP) sensor/switch – circuit malfunction	Wiring, accelerator pedal position (APP) sensor/switch, ECM
21	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
22	Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
25	Weak mixture	Wiring, air leak, fuel pressure, ignition system, injector, MAP sensor, HO2S, ECM
31	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
32	Module coding plug – malfunction	Wiring, module coding plug, ECM
33 <b>1</b>	Idle air control (IAC) valve	Wiring, IAC valve, ECM
33 <b>2</b>	Intake manifold air control solenoid – malfunction	Wiring, intake manifold air control solenoid, ECM
35	Manifold absolute pressure (MAP) sensor, TC system – circuit malfunction	Wiring, MAP sensor, MAP sensor control solenoid, hoses blocked/disconnected, ECM
39	Fuel temperature sensor – circuit malfunction	Wiring, fuel temperature sensor, ECM
41	Throttle position (TP) sensor	Wiring, TP sensor, ECM
42	Vehicle speed sensor (VSS) – circuit malfunction	Wiring, speedometer, VSS, ECM
43	Starter signal	Wiring, ignition switch, ECM
47	Throttle position (TP) sensor	Wiring, TP sensor, ECM
51	Switch signal – AC switch ON during diagnosis	Wiring, AC switch, AC control module, ECM
	Switch signal – PNP switch not in P or N during diagnosis	Wiring, PNP switch, ECM
	Switch signal – throttle position (TP) sensor, NO closed throttle signal during diagnosis	Wiring, TP sensor, ECM
52	Knock sensor (KS)	Wiring, KS, ECM
89	Engine control module (ECM) – malfunction	ECM
99	Immobilizer control system – malfunction	Wiring, immobilizer read coil amplifier, immobilizer read coil, immobilizer control module, ECM

**1** 3S-FE**2** 3C-TE

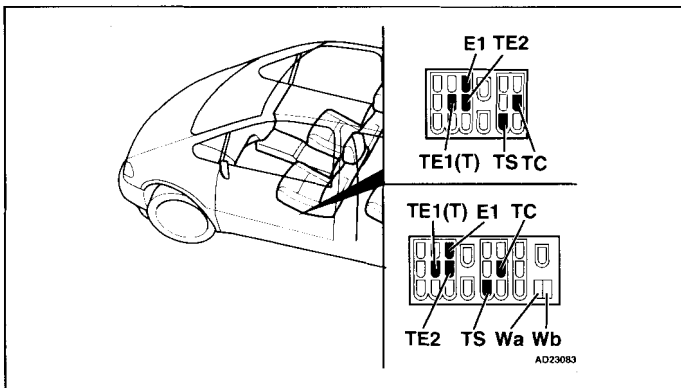


# TOYOTA

Model: Previa 2,4  
 Year: 1990-04/00  
 Engine code: 2TZ-FE  
 System: TCCS

Engine management

## Data link connector (DLC) locations



## Trouble codes

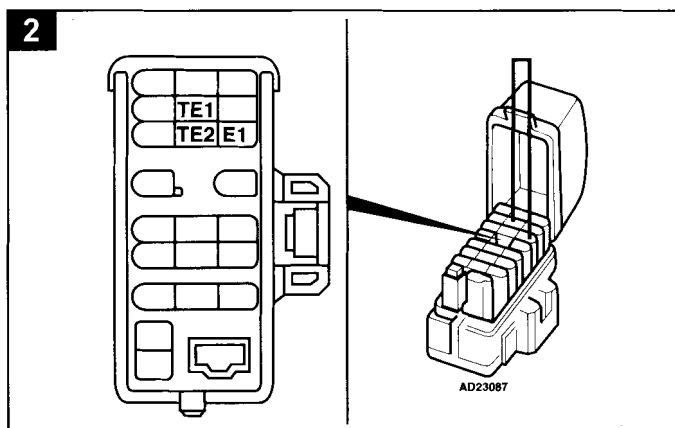
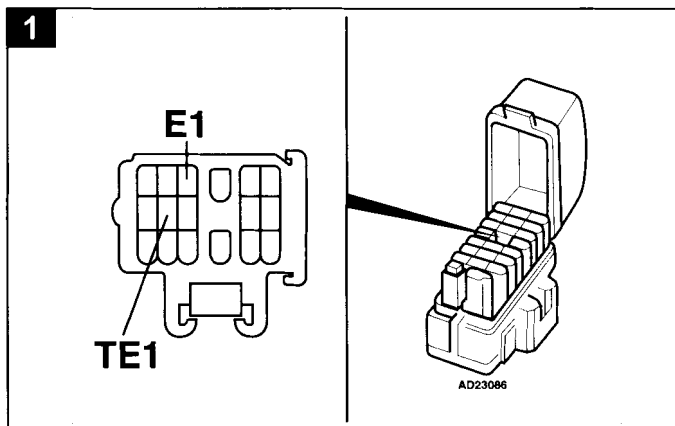
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- 1996 →: The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

### Accessing

#### Normal mode

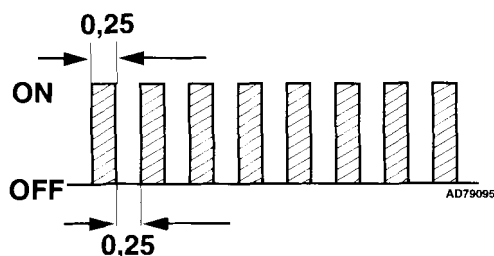
- Switch ignition ON.
- Bridge data link connector (DLC) terminals E1 and TE1.  
 →1996: **1**. 1996 →: **2**.
- If no trouble codes are stored, the lamp will flash twice per second **3**.
- Each trouble code consists of two groups of one or more flashes **4** [A].
- Warning lamp flash duration: 0,5 second **4** [B].
- A 0,5 second pause separates each flash **4** [C].
- A 1,5 second pause separates each trouble code group **4** [D].
- A 2,5 second pause separates each trouble code **4** [E].
- For example: Two 0,5 second flashes – 1,5 second pause – one 0,5 second flash. Trouble code 21 displayed **4** – heated oxygen sensor (HO2S).
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.







3



## Erasing

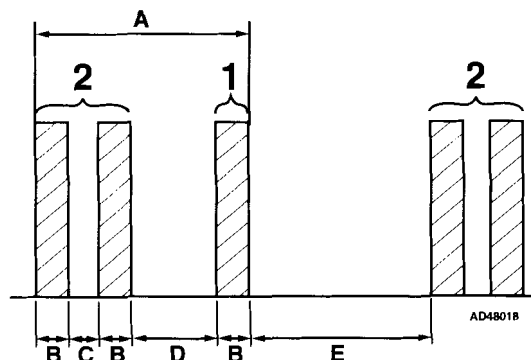
**NOTE:** Fuse removal duration depends on ambient temperature. The lower the temperature the longer the fuse must be removed.

- Switch ignition OFF.
- Remove EFI fuse (15A) from underbonnet fusebox for 30 seconds minimum **5**.
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

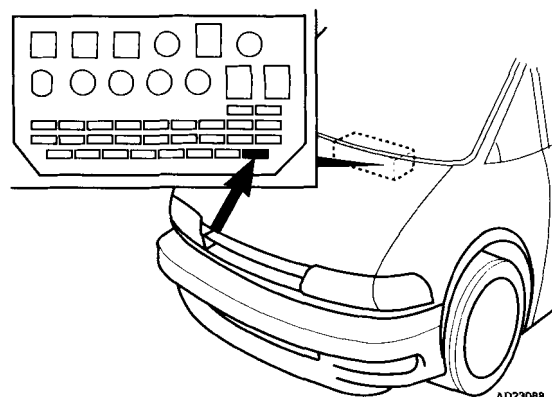
**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.

4



5



## Test mode 1996 →

- Switch ignition OFF.
- Bridge data link connector (DLC) terminals E1 and TE2 **2**.
- Switch ignition ON.
- Ensure malfunction indicator lamp (MIL) flashes four times per second.
- Start engine.
- Drive vehicle at over 6 mph (10 km/h) to meet conditions of customer complaint.
- Stop vehicle. Do not switch ignition OFF.
- With data link connector (DLC) terminals E1 and TE2 bridged, bridge terminals E1 and TE1 **2**.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.
- Remove bridge wires.
- Rectify faults as necessary.

**NOTE:** Code 42 will be produced when vehicle speed is 6 mph (10 km/h) or less and can be ignored.

**TOYOTA**

Model: Previa 2,4

**Engine management****Trouble code identification**

Flash type	Fault location	Probable cause
11111	No fault found	–
12	Camshaft position (CMP) sensor, crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal	Wiring, CMP sensor, CKP/RPM sensor, ignition amplifier, ECM
13	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal over 1000 rpm	Wiring, CKP/RPM sensor, ignition amplifier, ECM
14	Ignition signal – no signal	Wiring, ignition amplifier, ignition coil, ECM
16	Transmission control signal	Wiring, ECM
21	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM
22	Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
25	Weak mixture	Wiring, air leak, ECT sensor, IAT sensor, ignition system, fuel pressure, injector, VAF/MAP sensor, HO2S/O2S, ECM
26	Rich mixture	Wiring, ECT sensor, IAT sensor, fuel pressure, injector, cold start injector, VAF sensor, HO2S/O2S, ECM
27	Oxygen sensor (O2S)	Wiring, O2S, ECM
31	→1996: Volume air flow (VAF) sensor – circuit	Wiring, VAF sensor, ECM
	1996→: Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
32	Volume air flow (VAF) sensor – circuit	Wiring, VAF sensor, ECM
33	Idle air control (IAC) valve	Wiring, IAC valve, ECM
41	Throttle position (TP) sensor	Wiring, TP sensor, ECM
42	Vehicle speed sensor (VSS) – circuit malfunction	Wiring, speedometer, VSS, ECM
43	Starter signal	Wiring, ignition switch, ECM
51	Switch signal – AC switch ON during diagnosis	Wiring, AC switch, AC control module, ECM
	Switch signal – PNP switch not in P or N during diagnosis	Wiring, PNP switch, ECM
	Switch signal – throttle position (TP) sensor, NO closed throttle signal during diagnosis	Wiring, TP sensor, ECM
52	Knock sensor (KS)	Wiring, KS, ECM
53	Knock control – malfunction	ECM
99	Immobilizer control system – malfunction	Wiring, immobilizer read coil amplifier, immobilizer read coil, immobilizer control module, ECM



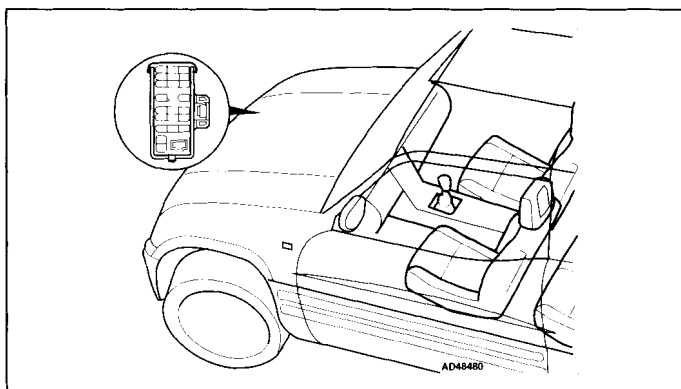
Model: RAV4  
 Year: 1994-00  
 Engine code: 3S-FE  
 System: TCCS

**TOYOTA**



Engine management

## Data link connector (DLC) locations



Underbonnet, RH

## Trouble codes

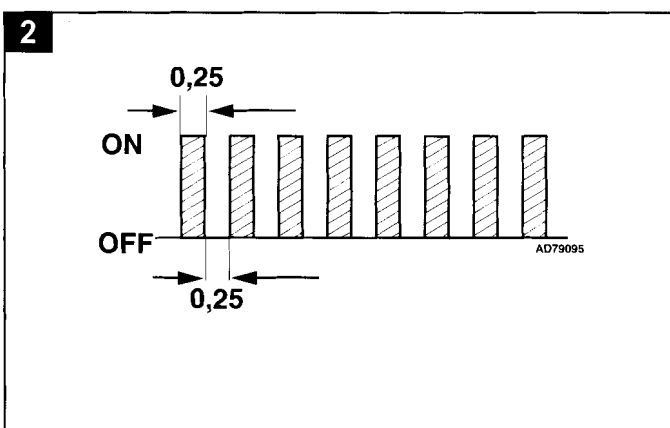
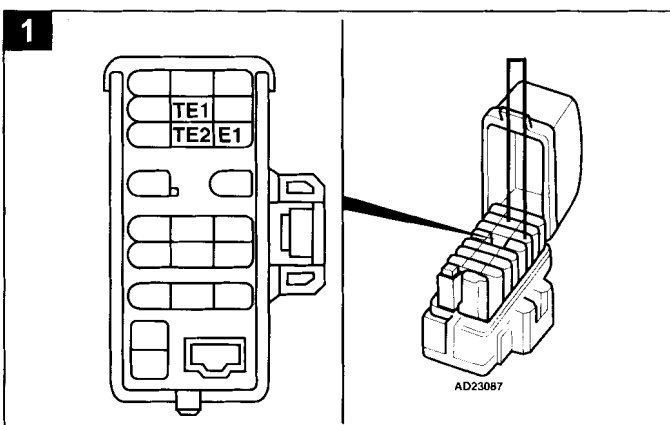
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- Some models: The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

### Accessing

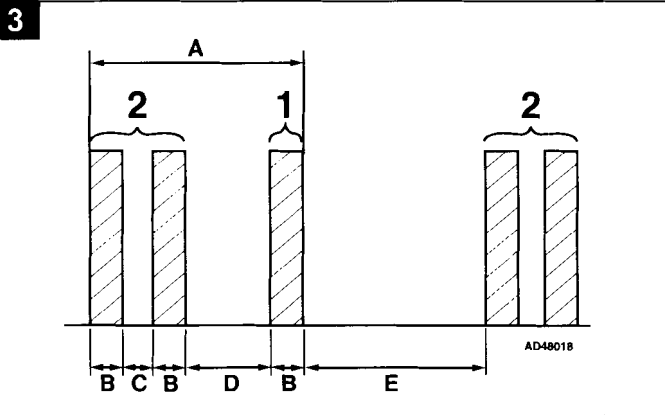
#### Normal mode

- Switch ignition ON.
- Bridge data link connector (DLC) terminals E1 and TE1 **1**.
- If no trouble codes are stored, the lamp will flash twice per second **2**.
- Each trouble code consists of two groups of one or more flashes **3** [A].
- Warning lamp flash duration: 0,5 second **3** [B].
- A 0,5 second pause separates each flash **3** [C].
- A 1,5 second pause separates each trouble code group **3** [D].
- A 2,5 second pause separates each trouble code **3** [E].
- For example: Two 0,5 second flashes – 1,5 second pause – one 0,5 second flash. Trouble code 21 displayed **3** – heated oxygen sensor (HO2S).
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.



**TOYOTA**

Model: RAV4

**Engine management****Test mode**

- Switch ignition OFF.
- Bridge data link connector (DLC) terminals E1 and TE2 **1**.
- Switch ignition ON.
- Ensure malfunction indicator lamp (MIL) flashes four times per second.
- Start engine.
- Drive vehicle at over 6 mph (10 km/h) to meet conditions of customer complaint.
- Stop vehicle. Do not switch ignition OFF.
- With data link connector (DLC) terminals E1 and TE2 bridged, bridge terminals E1 and TE1 **1**.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF.
- Remove bridge wires.
- Rectify faults as necessary.

**NOTE:** Codes 42 and 43 may be produced if this procedure is NOT carried out correctly. Code 51 will be produced during this procedure and can be ignored.

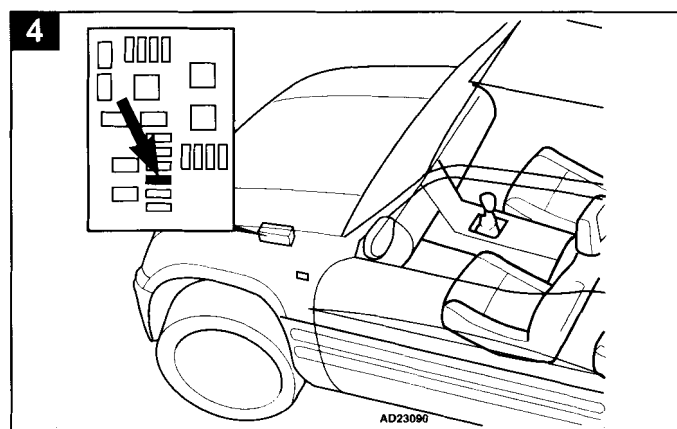
**Erasing**

**NOTE:** Fuse removal duration depends on ambient temperature. The lower the temperature the longer the fuse must be removed.

- Switch ignition OFF.
- Remove EFI fuse (15A) from underbonnet fusebox for 10 seconds minimum **4**.
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.

**Trouble code identification**

Flash type	Fault location	Probable cause
11111	No fault found	–
12 <b>1</b>	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – no signal	Wiring, CKP/CMP sensor, ignition amplifier, ECM
12 <b>2</b>	Crankshaft position (CKP) sensor/camshaft position (CMP) sensor – no signal	Wiring, CKP/CMP sensor, ECM
13 <b>1</b>	Crankshaft position (CKP) sensor – no signal over 1500 rpm	Wiring, CKP sensor, ignition amplifier, ECM
13 <b>2</b>	Crankshaft position (CKP) sensor – no signal over 1000 rpm	Wiring, CKP sensor, ECM
14 <b>1</b>	Ignition signal – no signal	Wiring, ignition amplifier, ECM
14 <b>2</b>	Ignition coil/amplifier 1 – malfunction	Wiring, ignition coil/amplifier, ECM
15	Ignition coil/amplifier 2 – malfunction	Wiring, ignition coil/amplifier, ECM
16	Transmission control signal	Wiring, ECM
21	Heated oxygen sensor (HO2S)	Wiring, HO2S, ECM

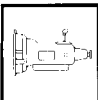


Flash type	Fault location	Probable cause
22	Engine coolant temperature (ECT) sensor – open/short circuit	Wiring, ECT sensor, ECM
24	Intake air temperature (IAT) sensor – open/short circuit	Wiring, IAT sensor, ECM
25	Weak mixture	Wiring, air leak, ECT sensor, IAT sensor, ignition system, fuel pressure, injector, MAP sensor, HO2S, ECM
31	Manifold absolute pressure (MAP) sensor	Wiring, MAP sensor, ECM
33	Idle air control (IAC) valve	Wiring, IAC valve, ECM
41	Throttle position (TP) sensor	Wiring, TP sensor, ECM
42	Vehicle speed sensor (VSS) – circuit malfunction	Wiring, speedometer, VSS, ECM
43	Starter signal	Wiring, ignition switch, ECM
51	Switch signal – AC switch ON during diagnosis	Wiring, AC switch, AC control module, ECM
	Switch signal – PNP switch not in P or N during diagnosis	Wiring, PNP switch, ECM
	Switch signal – throttle position (TP) sensor, NO closed throttle signal during diagnosis	Wiring, TP sensor, ECM
52	Knock sensor (KS)	Wiring, KS, ECM
99	Immobilizer control system – malfunction	Wiring, immobilizer read coil amplifier, immobilizer read coil, immobilizer control module, ECM

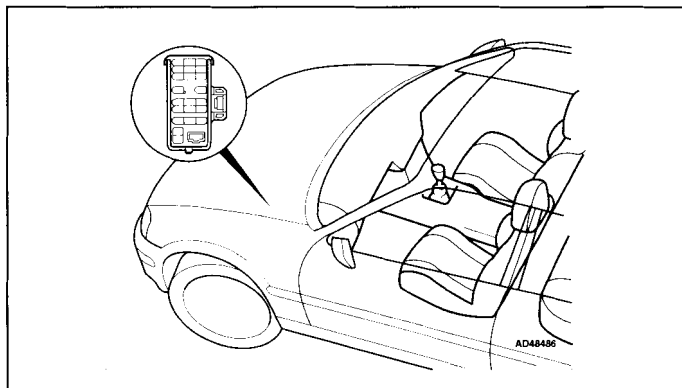
1 →1996

2 1996 →



**TOYOTA**

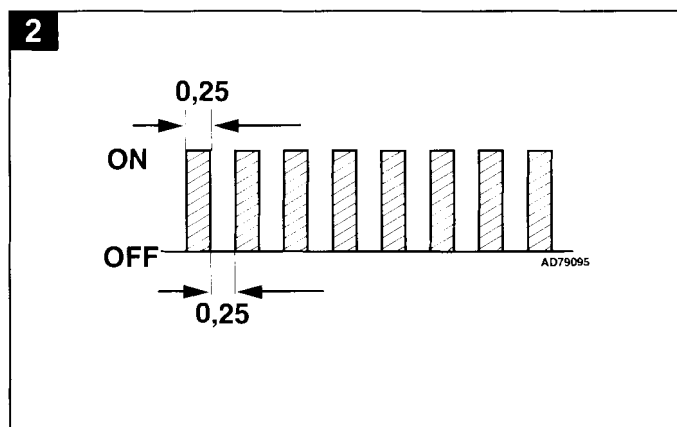
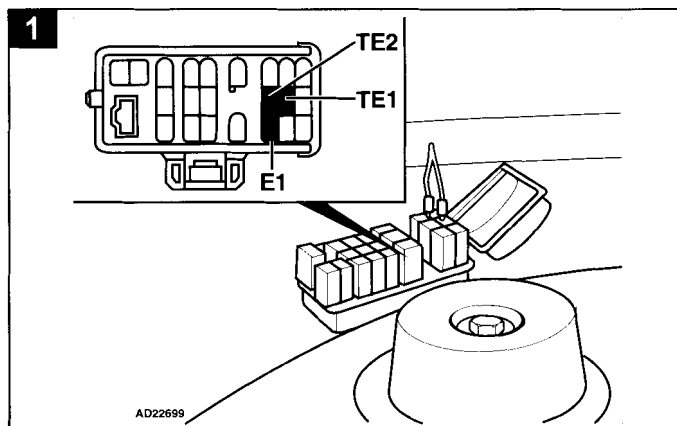
Model: Carina E  
Year: 1992-98

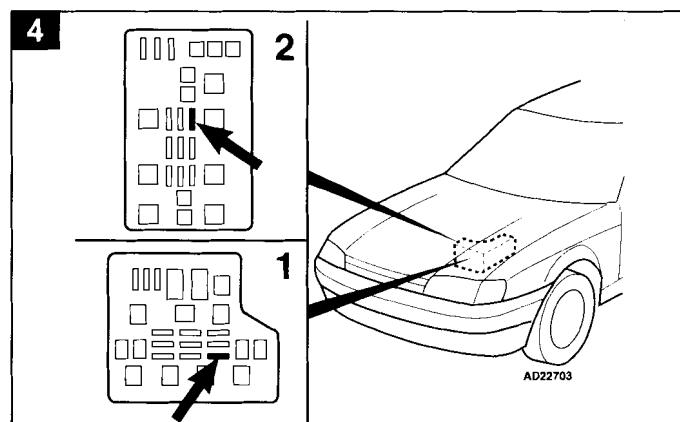
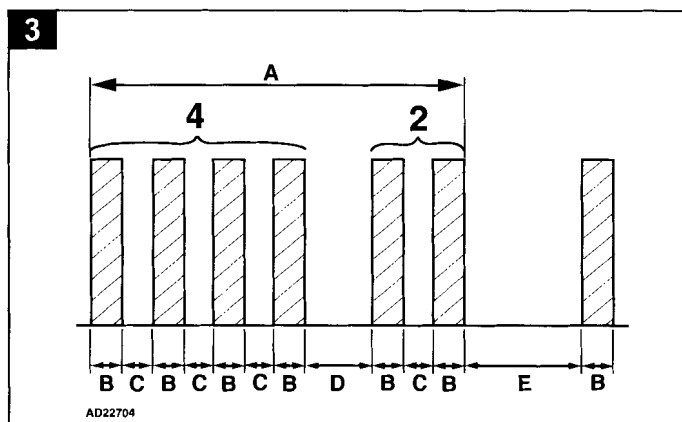
**Transmission****Data link connector (DLC) locations****Underbonnet, LH****Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the 'O/D OFF' warning lamp.

**Accessing**

- Switch ignition ON.
- Check operation of 'O/D OFF' lamp.
- Switch the O/D switch on the gear lever to ON.
- Check that 'O/D OFF' lamp extinguishes.
- Bridge data link connector (DLC) terminals E1 and TE1 **1**.
- If no trouble codes are stored, the lamp will flash twice per second **2**.
- Each trouble code consists of two groups of one or more flashes **3** [A].
- Warning lamp flash duration: 0,5 second **3** [B].
- A 0,5 second pause separates each flash **3** [C].
- A 1,5 second pause separates each trouble code group **3** [D].
- A 2,5 second pause separates each trouble code **3** [E].
- For example: Four 0,5 second flashes – 1,5 second pause – two 0,5 second flashes. Trouble code 42 displayed **3** – vehicle speed sensor (VSS) 1.
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count warning lamp flashes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.





### Erasing

**NOTE:** Fuse removal duration depends on ambient temperature.  
The lower the temperature the longer the fuse must be removed.

- Switch ignition OFF.
- Remove EFI fuse (15/20A) from underbonnet fusebox for 10 seconds minimum. 1,6/1,8: **4** [1]. 2,0: **4** [2].
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

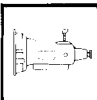
**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.

### Trouble code identification

Flash type	Fault location	Probable cause
42	Vehicle speed sensor (VSS) 1 – instruments	Wiring, VSS, ECM
61	Vehicle speed sensor (VSS) 2 – transmission	Wiring, VSS, ECM
62	Shift solenoid 1	Wiring, solenoid, ECM
63	Shift solenoid 2	Wiring, solenoid, ECM
64	Transmission lock-up solenoid	Wiring, solenoid, ECM



**TOYOTA**

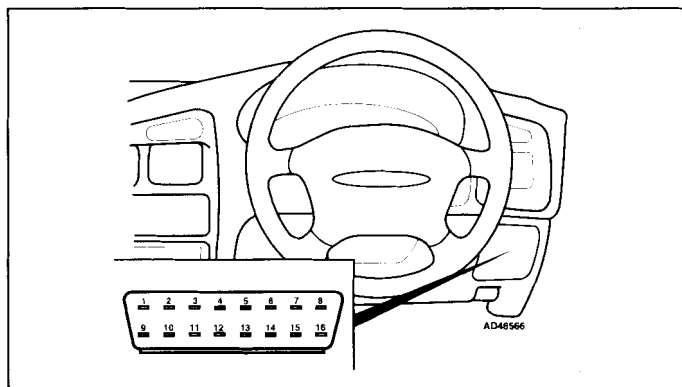
Model:

Avensis

Year:

1998-07/00

Transmission

**Data link connector (DLC) locations**

Fascia

**Trouble codes**

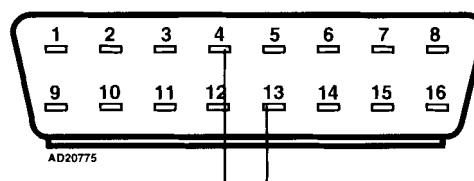
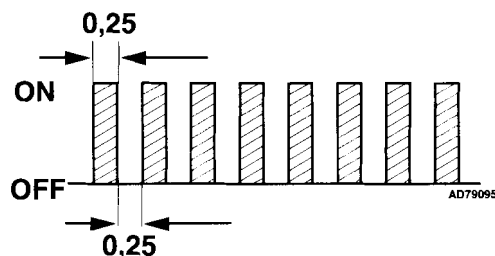
**NOTE:** Engine control module (ECM) incorporates transmission control function.

**General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the 'O/D OFF' warning lamp.
- More detailed fault diagnosis information can be obtained using diagnostic equipment connected to the data link connector (DLC).

**Accessing**

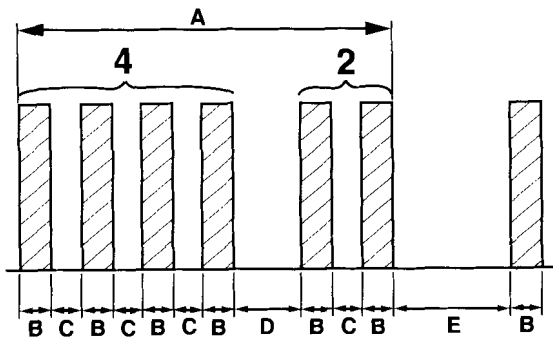
- Switch ignition ON.
- Check operation of 'O/D OFF' lamp.
- Switch the O/D switch on the gear lever to ON.
- Check that 'O/D OFF' lamp extinguishes.
- Bridge data link connector (DLC) terminals 4 and 13 **1**.
- If no trouble codes are stored, the lamp will flash twice per second **2**.
- Each trouble code consists of two groups of one or more flashes **3** [A].
- Warning lamp flash duration: 0,5 second **3** [B].
- A 0,5 second pause separates each flash **3** [C].
- A 1,5 second pause separates each trouble code group **3** [D].
- A 2,5 second pause separates each trouble code **3** [E].
- For example: Four 0,5 second flashes – 1,5 second pause – two 0,5 second flashes. Trouble code 42 displayed **3** – vehicle speed sensor (VSS) 1.
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count warning lamp flashes. Compare with trouble code table.
- Remove bridge wire. Switch ignition OFF. Rectify faults as necessary.

**1****2**





3

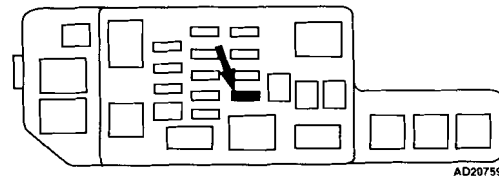


## Erasing

- Ensure ignition switched OFF.
- Remove EFI fuse (15A) from underbonnet fusebox for 10 seconds minimum **4**.
- Refit fuse.
- Diagnostic equipment can also be used to erase data from ECM fault memory.
- Repeat accessing procedure to ensure trouble codes erased.
- Trouble codes may also be erased by disconnecting battery leads.

**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).

4



## Trouble code identification

Flash type	Fault location	Probable cause
42	Vehicle speed sensor (VSS) – circuit malfunction	Wiring, VSS, speedometer, TCM
62	Shift solenoid (SS) A	Wiring, solenoid, TCM
63	Shift solenoid (SS) B	Wiring, solenoid, TCM
64	Shift solenoid (SS) E – transmission lock-up solenoid	Wiring, solenoid, TCM



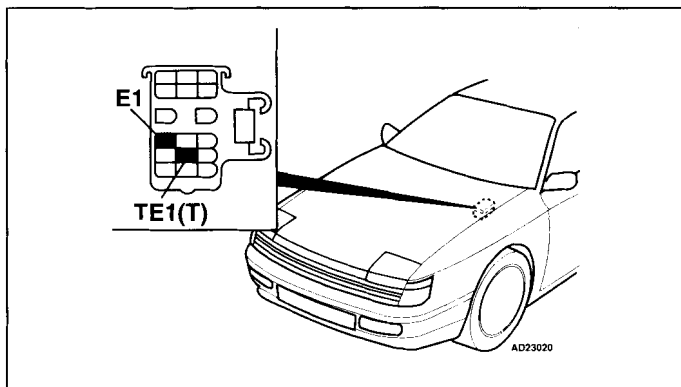
**TOYOTA**

Model:

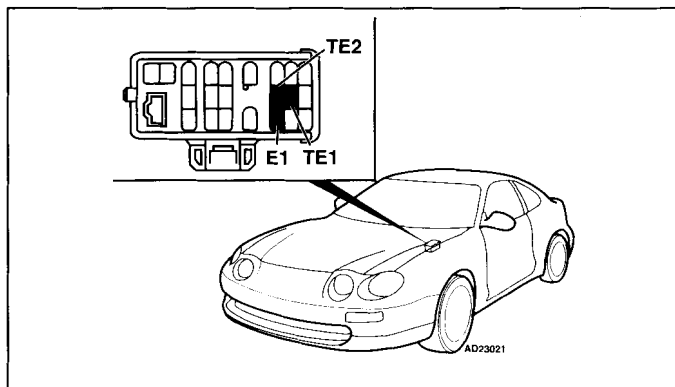
Celica 2,0

Year:

1985-99

**Transmission****Data link connector (DLC) locations**

1985-94 – underbonnet, LH



1994-99 – underbonnet, LH

**Trouble codes**

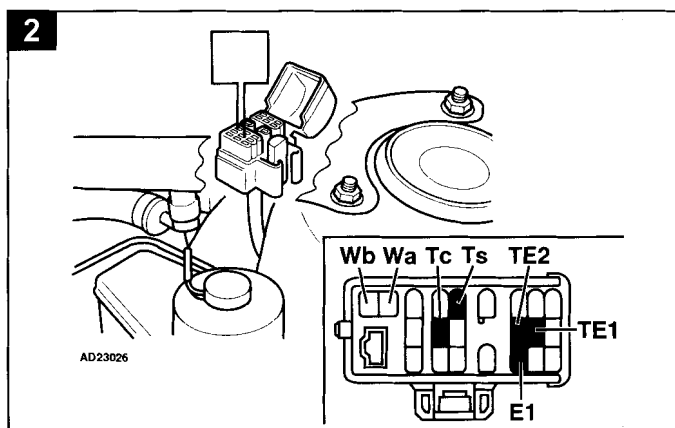
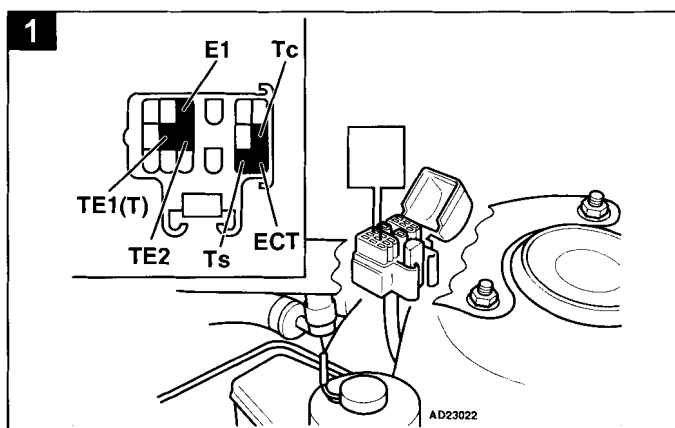
NOTE: 1990 →: Engine control module (ECM) incorporates transmission control function.

**General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the 'O/D OFF' warning lamp.

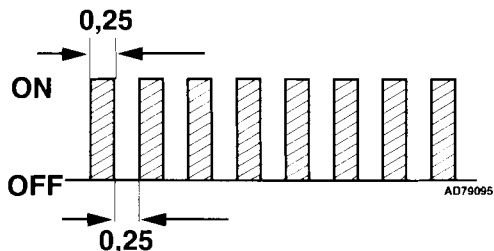
**Accessing**

- Switch ignition ON.
- Check operation of 'O/D OFF' lamp.
- Switch the O/D switch on the gear lever to ON.
- Check that 'O/D OFF' lamp extinguishes.
- 1985-90: Bridge data link connector (DLC) terminals E1 and ECT **1**.
- 1990 →: Bridge data link connector (DLC) terminals E1 and TE1. 1990-94: **1**. 1994 →: **2**.
- If no trouble codes are stored, the lamp will flash twice per second **3**.
- Each trouble code consists of two groups of one or more flashes **4** [A].
- Warning lamp flash duration: 0,5 second **4** [B].
- A 0,5 second pause separates each flash **4** [C].
- A 1,5 second pause separates each trouble code group **4** [D].
- A 2,5 second pause separates each trouble code **4** [E].
- For example: Four 0,5 second flashes – 1,5 second pause – two 0,5 second flashes. Trouble code 42 displayed **4** – vehicle speed sensor (VSS) 1.
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count warning lamp flashes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.

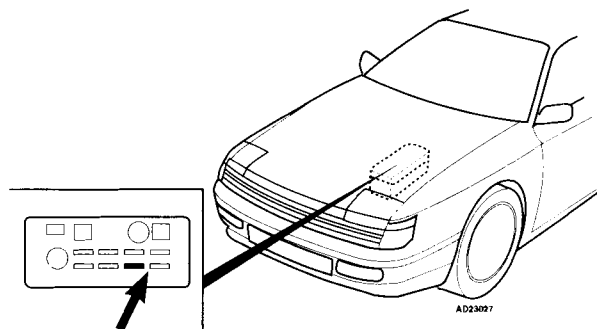




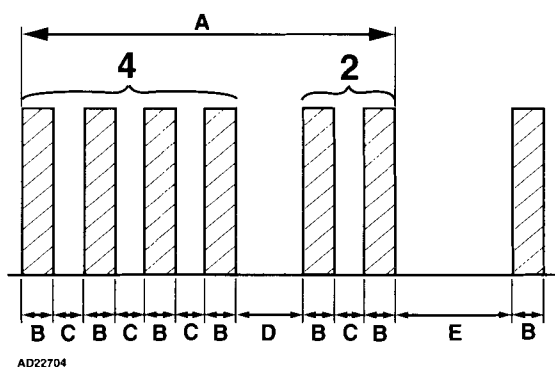
3



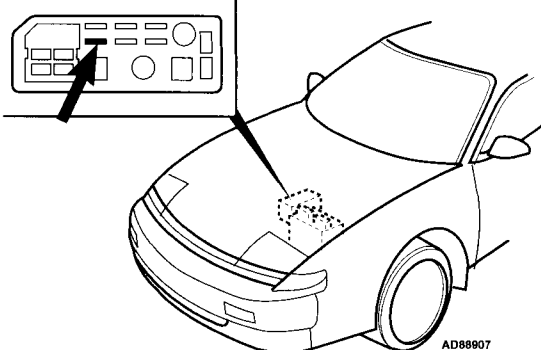
5



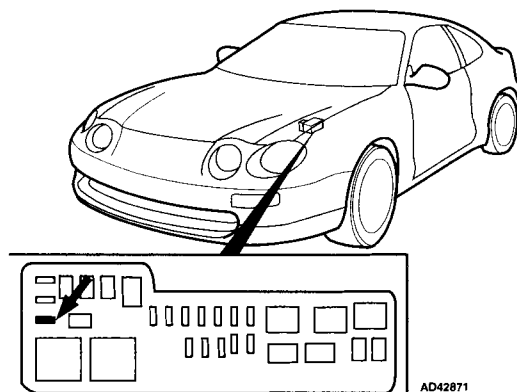
4



6



7



## Erasing

**NOTE:** Fuse removal duration depends on ambient temperature. The lower the temperature the longer the fuse must be removed.

- Switch ignition OFF.
- 1985-90: Remove fuse RADIO no. 1 (15A) from underbonnet fusebox for 10 seconds minimum **5**.
- 1990 →: Remove EFI fuse (15A) from underbonnet fusebox for 10 seconds minimum. 1990-94: **6**. 1994-99: **7**.
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

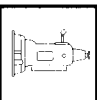
- Repeat checking procedure to ensure no data remains in ECM fault memory.

## Trouble code identification

Flash type	Fault location	Probable cause
42	Vehicle speed sensor (VSS) 1 – instruments	Wiring, VSS, TCM
61	Vehicle speed sensor (VSS) 2 – transmission	Wiring, VSS, TCM
62	Shift solenoid 1	Wiring, solenoid, TCM
63	Shift solenoid 2	Wiring, solenoid, TCM
64 <b>1</b>	Shift solenoid 3	Wiring, solenoid, TCM
64 <b>2</b>	Transmission lock-up solenoid	Wiring, solenoid, TCM

**1** 1985-90

**2** 1990 →

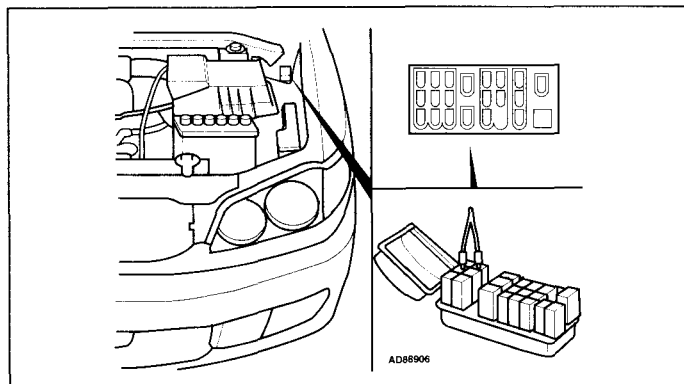


# TOYOTA

Model: Picnic  
Year: 1996-00  
System: TCCS

Transmission

## Data link connector (DLC) locations



Underbonnet, LH

## Trouble codes

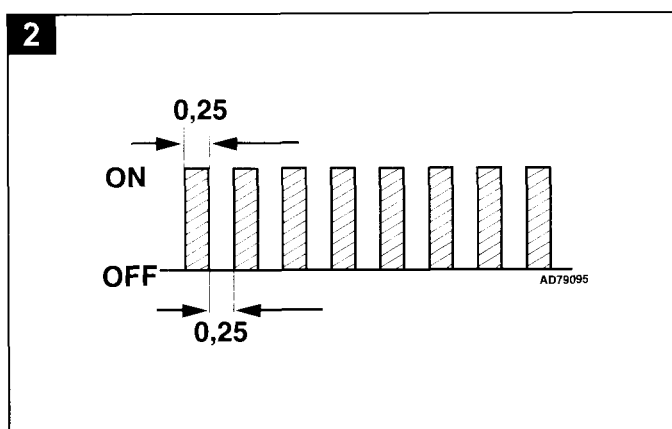
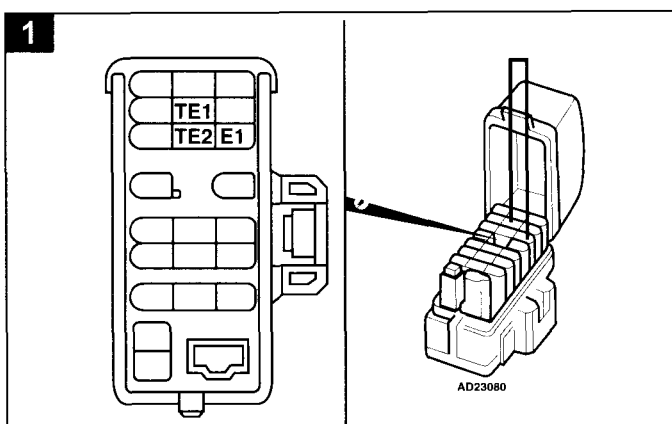
**NOTE:** Engine control module (ECM) incorporates transmission control function.

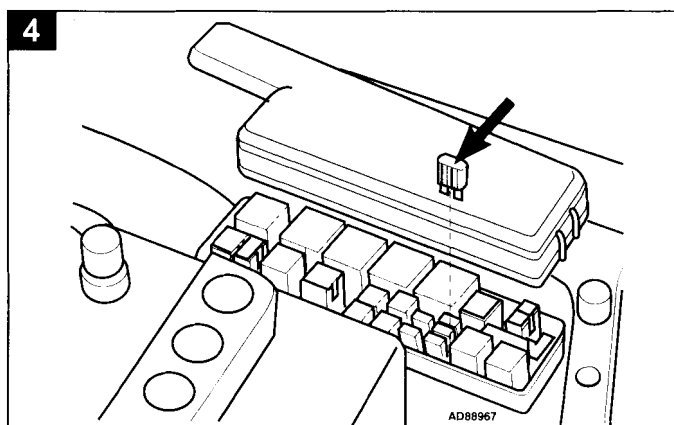
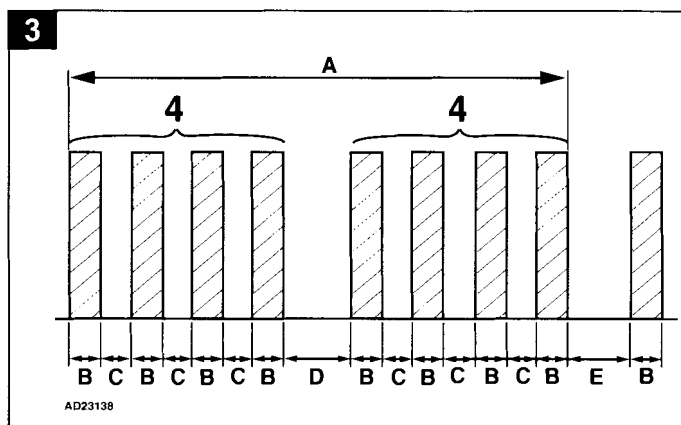
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the 'O/D OFF' warning lamp.

### Accessing

- Switch ignition ON.
- Check operation of 'O/D OFF' lamp.
- Switch the O/D switch on the gear lever to ON.
- Check that 'O/D OFF' lamp extinguishes.
- Bridge data link connector (DLC) terminals E1 and TE1 **1**.
- If no trouble codes are stored, the lamp will flash twice per second **2**.
- Each trouble code consists of two groups of one or more flashes **3** [A].
- Warning lamp flash duration: 0,5 second **3** [B].
- A 0,5 second pause separates each flash **3** [C].
- A 1,5 second pause separates each trouble code group **3** [D].
- A 2,5 second pause separates each trouble code **3** [E].
- For example: Four 0,5 second flashes – 1,5 second pause – four 0,5 second flashes. Trouble code 44 displayed **3** – vehicle speed sensor (VSS) 1 – malfunction.
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count warning lamp flashes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.





### Erasing

**NOTE:** Fuse removal duration depends on ambient temperature.  
The lower the temperature the longer the fuse must be removed.

- Switch ignition OFF.
- Remove EFI fuse (15A) from underbonnet fusebox for 10 seconds minimum **4**.
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

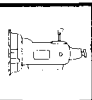
**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.

### Trouble code identification

Flash type	Fault location	Probable cause
11111	No fault found	–
44	Vehicle speed sensor 1 – malfunction	Wiring, VSS, speedometer, ECM
62	Shift solenoid 1 – circuit malfunction	Wiring, solenoid, ECM
63	Shift solenoid 2 – circuit malfunction	Wiring, solenoid, ECM
64	Transmission lock-up solenoid – circuit malfunction	Wiring, solenoid, ECM



**TOYOTA**

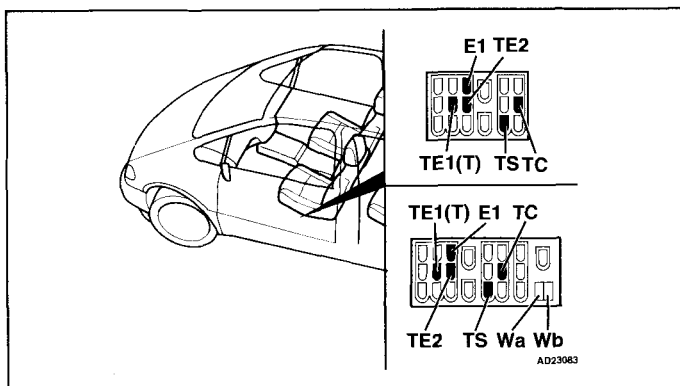
Model:

Previa

Year:

1990-04/00

Transmission

**Data link connector (DLC) locations****Trouble codes**

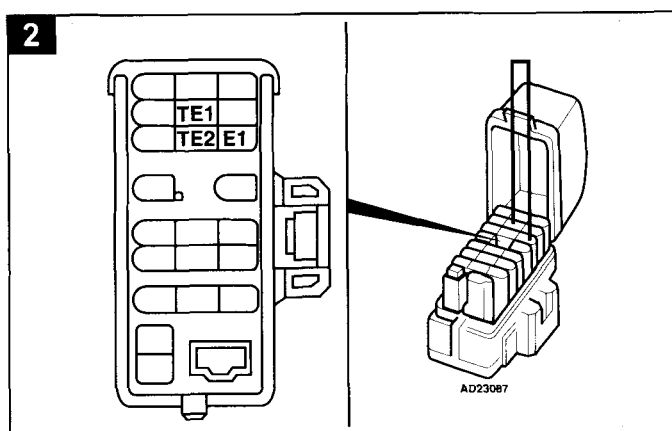
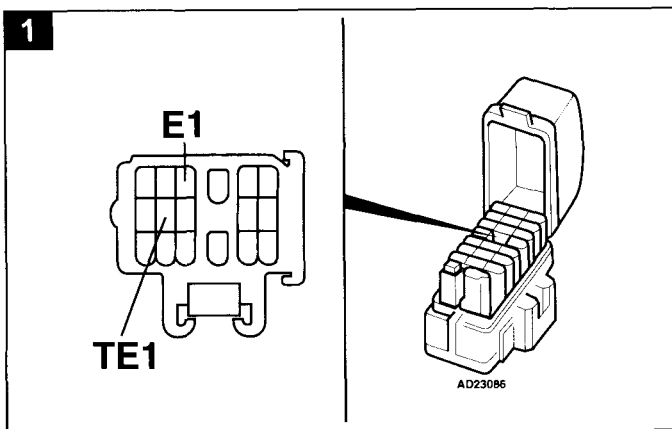
**NOTE:** Engine control module (ECM) incorporates transmission control function.

**General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the 'O/D OFF' warning lamp.

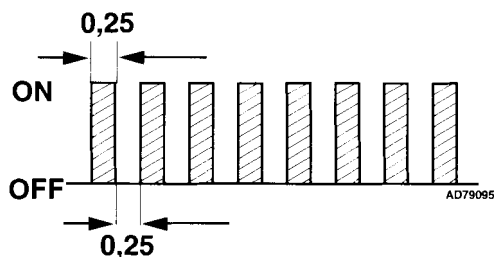
**Accessing**

- Switch ignition ON.
- Check operation of 'O/D OFF' lamp.
- Switch the O/D switch on the gear lever to ON.
- Check that 'O/D OFF' lamp extinguishes.
- Bridge data link connector (DLC) terminals E1 and TE1.  
→1996: **1**. 1996 →: **2**.
- If no trouble codes are stored, the lamp will flash twice per second **3**.
- Each trouble code consists of two groups of one or more flashes **4** [A].
- Warning lamp flash duration: 0,5 second **4** [B].
- A 0,5 second pause separates each flash **4** [C].
- A 1,5 second pause separates each trouble code group **4** [D].
- A 2,5 second pause separates each trouble code **4** [E].
- For example: Four 0,5 second flashes – 1,5 second pause – two 0,5 second flashes. Trouble code 42 displayed **4** – vehicle speed sensor (VSS) 1.
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count warning lamp flashes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.





3



## Erasing

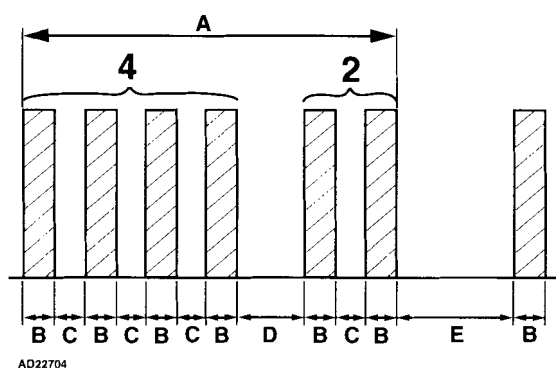
**NOTE:** Fuse removal duration depends on ambient temperature. The lower the temperature the longer the fuse must be removed.

- Switch ignition OFF.
- Remove EFI fuse (15A) from underbonnet fusebox for 10 seconds minimum **5**.
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

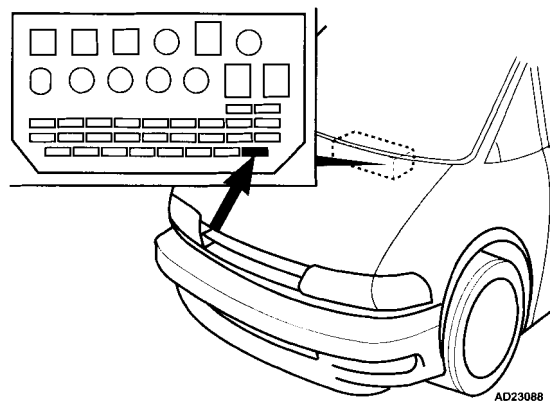
**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.

4



5



## Trouble code identification

Flash type	Fault location	Probable cause
42	Vehicle speed sensor (VSS) 1 – instruments	Wiring, VSS, ECM
61	Vehicle speed sensor (VSS) 2 – transmission	Wiring, VSS, ECM
62	Shift solenoid 1	Wiring, solenoid, ECM
63	Shift solenoid 2	Wiring, solenoid, ECM
64	Transmission lock-up solenoid	Wiring, solenoid, ECM



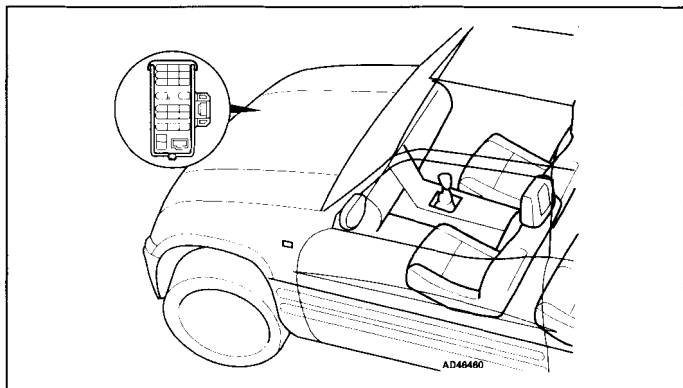


# TOYOTA

Model: RAV4  
Year: 1994-00  
Engine code: 3S-FE  
System: TCCS

## Transmission

### Data link connector (DLC) locations



### Trouble codes

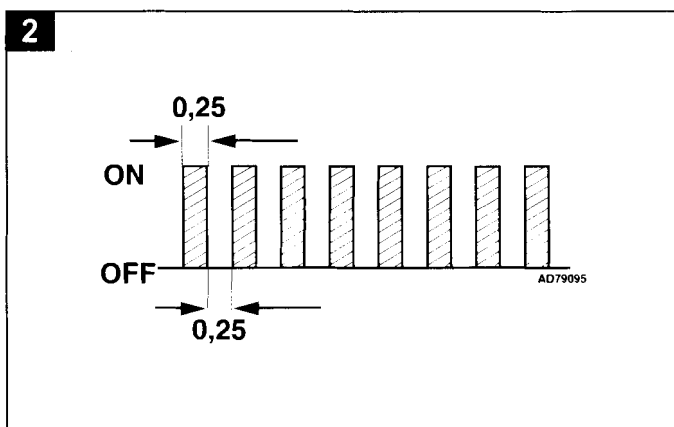
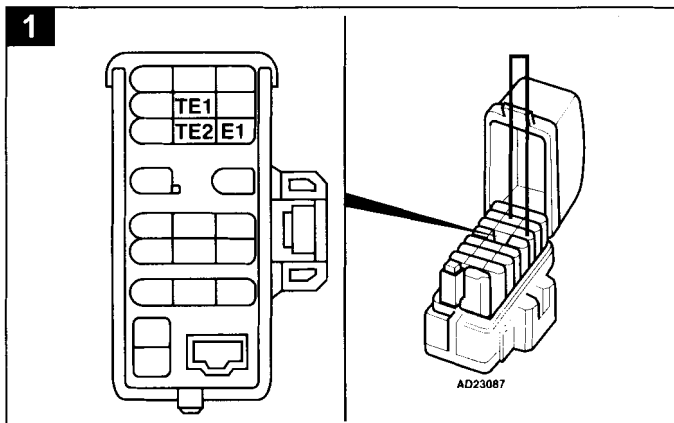
**NOTE:** Engine control module (ECM) incorporates transmission control function.

#### General information

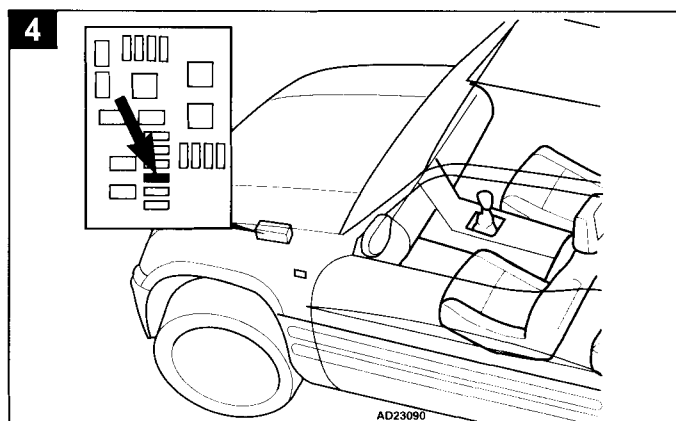
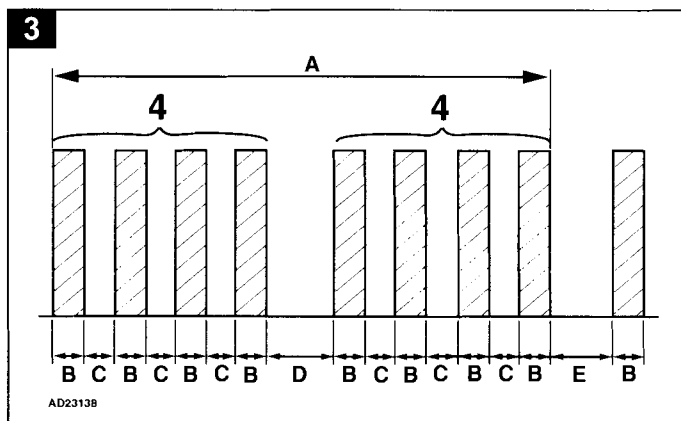
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the 'O/D OFF' warning lamp.

#### Accessing

- Switch ignition ON.
- Check operation of 'O/D OFF' lamp.
- Switch the O/D switch on the gear lever to ON.
- Check that 'O/D OFF' lamp extinguishes.
- Bridge data link connector (DLC) terminals E1 and TE1 **1**.
- If no trouble codes are stored, the lamp will flash twice per second **2**.
- Each trouble code consists of two groups of one or more flashes **3** [A].
- Warning lamp flash duration: 0,5 second **3** [B].
- A 0,5 second pause separates each flash **3** [C].
- A 1,5 second pause separates each trouble code group **3** [D].
- A 2,5 second pause separates each trouble code **3** [E].
- For example: Four 0,5 second flashes – 1,5 second pause – four 0,5 second flashes. Trouble code 44 displayed **3** – transmission output shaft speed sensor 1 – malfunction.
- Trouble codes are repeated 4,5 seconds after last trouble code.
- Count warning lamp flashes. Compare with trouble code table.
- Remove bridge wire.
- Switch ignition OFF.
- Rectify faults as necessary.







### Erasing

**NOTE:** Fuse removal duration depends on ambient temperature.  
The lower the temperature the longer the fuse must be removed.

- Switch ignition OFF.
- Remove EFI fuse (15A) from underhood fusebox for 10 seconds minimum **4**.
- Refit fuse.
- Trouble codes may also be erased by disconnecting battery leads.

**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.

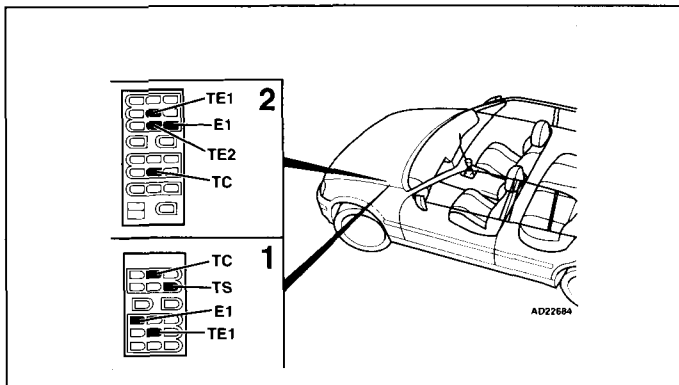
### Trouble code identification

Flash type	Fault location	Probable cause
11111	No fault found	–
44	Transmission output shaft speed sensor 1 rear – malfunction	Wiring, transmission output shaft speed sensor, ECM
61	Transmission output shaft speed sensor 2 front – malfunction	Wiring, transmission output shaft speed sensor, ECM
62	Shift solenoid 1 – circuit malfunction	Wiring, solenoid, ECM
63	Shift solenoid 2 – circuit malfunction	Wiring, solenoid, ECM
64	Transmission lock-up solenoid – circuit malfunction	Wiring, solenoid, ECM
73	Central differential clutch control solenoid – circuit malfunction	Wiring, solenoid, ECM
77	Transmission fluid pressure (TFP) solenoid – circuit malfunction	Wiring, solenoid, ECM



**TOYOTA**

Model: **Starlet**  
 Year: **1996-99**

**Immobilizer****Data link connector (DLC) locations****[1] – SOHC – engine bay, LH****[2] – DOHC – engine bay, LH****Trouble codes****General information**

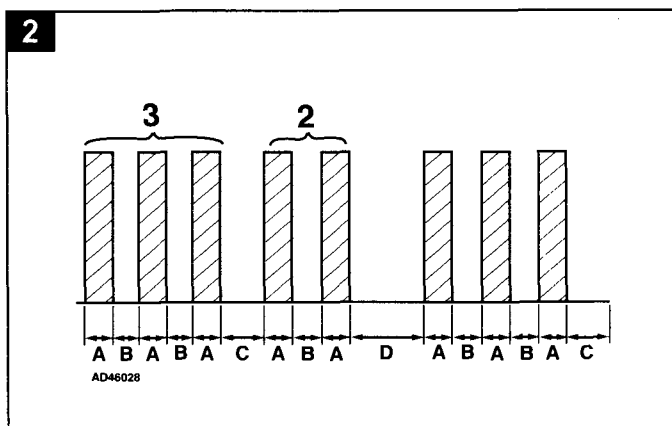
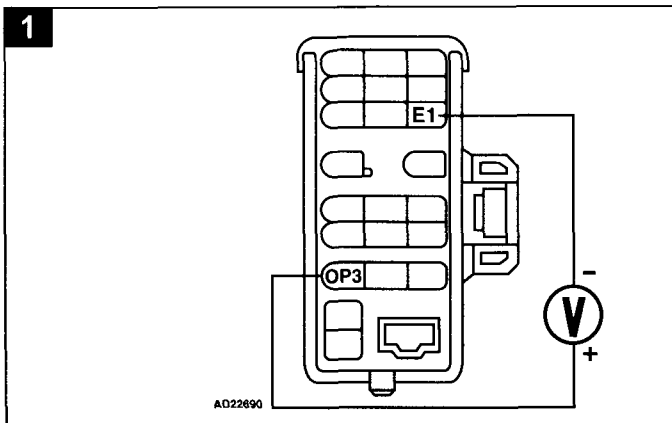
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an analogue voltmeter connected to the data link connector (DLC).

**Accessing**


- Ensure ignition switched OFF.
- Remove ignition key.
- Connect analogue voltmeter between data link connector (DLC) terminals as follows:
- Connect voltmeter negative (-) terminal to DLC terminal E1 **1**.
- Connect voltmeter positive (+) terminal to DLC terminal OP3 **1**.

**NOTE:** An LED with an activation current of 10-20 mA can also be used.

- Insert ignition key.
- Count voltmeter needle deflections. Note trouble codes. Compare with trouble code table.
- If no trouble codes are output: Check fuses.
- Each trouble code consists of two groups of one or more needle deflections **2**.
- A 1,5 second pause separates each trouble code group **2** [C].
- Voltmeter needle deflection duration: 0,5 second **2** [A].
- A 0,5 second pause separates each deflection **2** [B].
- A 2,5 second pause separates each trouble code **2** [D].
- A 4,5 second pause follows the last trouble code, before they are repeated.
- Rectify faults as necessary.

**Erasing**

- Rectifying faults erases trouble codes.

Model: Starlet	<b>TOYOTA</b>	
Immobilizer		

## Trouble code identification

**NOTE:** Trouble codes 11-22 DO NOT indicate a fault condition and should be output if conditions are met.

Flash type	Fault location	Probable cause
11	Ignition key inserted into ignition switch	NO code output: Wiring, ignition key warning switch, immobilizer control module
12	Any door is open	NO code output: Wiring, door contact switch, immobilizer control module
13	Ignition switched ON	NO code output: Wiring, IGN fuse, immobilizer control module
21	Master key (black) – inserted	Immobilizer deactivated
22	Sub key (grey) – inserted	Immobilizer deactivated
31	Ignition key – incorrect programming	Ignition key not matched
32	Ignition key – no communication	Wiring, immobilizer read coil, immobilizer read coil amplifier, immobilizer control module
33	Ignition key – incorrect signal	Ignition key not matched/damaged, immobilizer read coil amplifier, immobilizer control module
34	Immobilizer control module – insufficient memory	Immobilizer control module





# TOYOTA

Model:

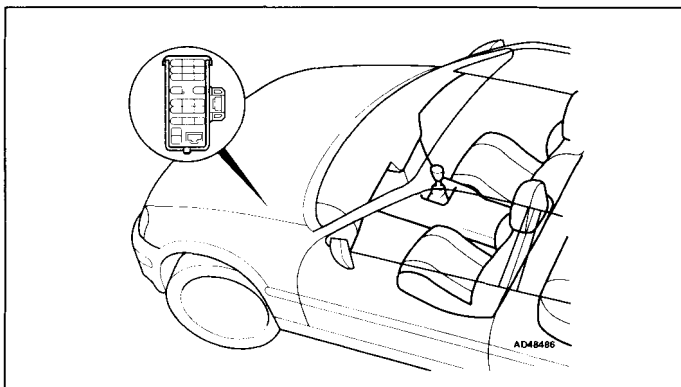
Corolla

Year:

1995-01/00

Immobilizer

## Data link connector (DLC) locations



Underbonnet, LH\*

## Trouble codes

### General information

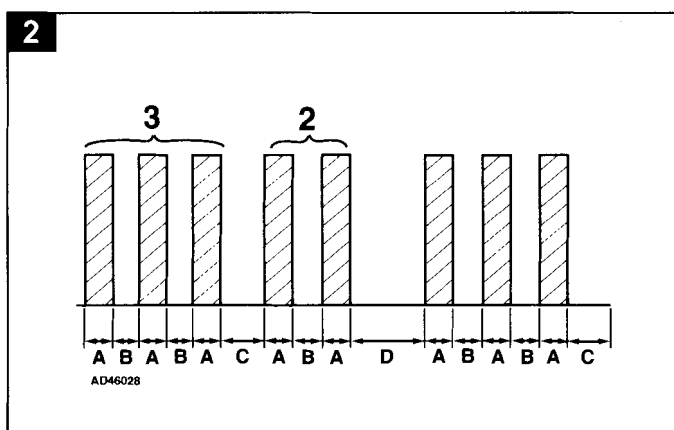
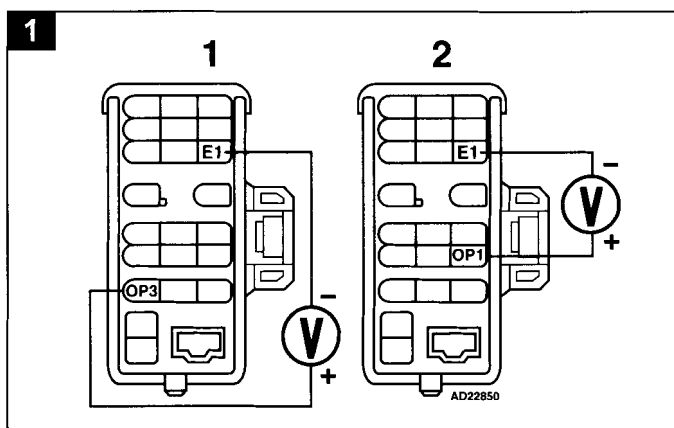
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an analogue voltmeter connected to the data link connector (DLC).

### Accessing

- Ensure ignition switched OFF.
- Remove ignition key.
- Connect analogue voltmeter between data link connector (DLC) terminals as follows:
- Connect voltmeter negative (-) terminal to DLC terminal E1 **1** [1] and [2].
- 1997: Connect voltmeter positive (+) terminal to DLC terminal OP3 **1** [1].
- 1997 →: Connect voltmeter positive (+) terminal to DLC terminal OP1 **1** [2].

**NOTE:** An LED with an activation current of 10-20 mA can also be used.

- Insert ignition key.
- Count voltmeter needle deflections. Note trouble codes. Compare with trouble code table.
- If no trouble codes are output: Check fuses.
- Each trouble code consists of two groups of one or more needle deflections **2**.
- A 1,5 second pause separates each trouble code group **2** [C].
- Voltmeter needle deflection duration: 0,5 second **2** [A].
- A 0,5 second pause separates each deflection **2** [B].
- A 2,5 second pause separates each trouble code **2** [D].
- A 4,5 second pause follows the last trouble code, before they are repeated.
- Rectify faults as necessary.



### Erasing

- Rectifying faults erases trouble codes.



### Trouble code identification

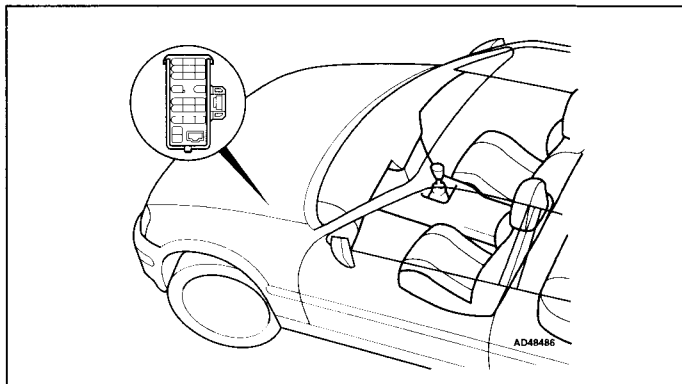
NOTE: Trouble codes 11-22 DO NOT indicate a fault condition and should be output if conditions are met.

Flash type	Fault location	Probable cause
11	Ignition key inserted into ignition switch	NO code output: Wiring, ignition key warning switch, immobilizer control module
12	Any door is open	NO code output: Wiring, door contact switch, immobilizer control module
13	Ignition switched ON	NO code output: Wiring, IGN fuse, immobilizer control module
21	Master key (black) – inserted	Immobilizer deactivated
22	Sub key (grey) – inserted	Immobilizer deactivated
31	Ignition key – incorrect programming	Ignition key not matched
32	Ignition key – no communication	Wiring, immobilizer read coil, immobilizer read coil amplifier, immobilizer control module
33	Ignition key – incorrect signal	Ignition key not matched/damaged, immobilizer read coil amplifier, immobilizer control module
34	Immobilizer control module – insufficient memory	Immobilizer control module





### Data link connector (DLC) locations



Underbonnet, LH

### Trouble codes

#### General information

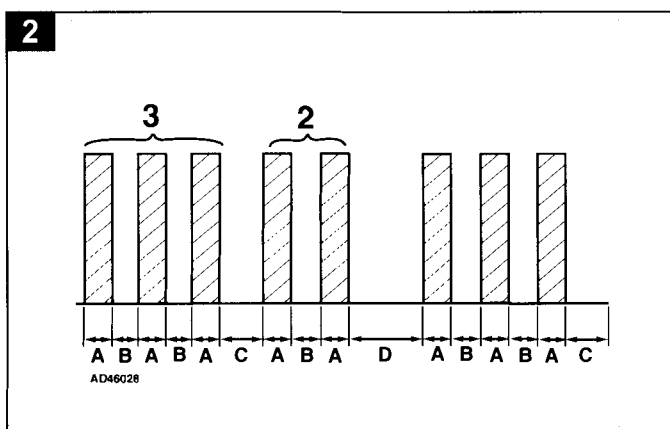
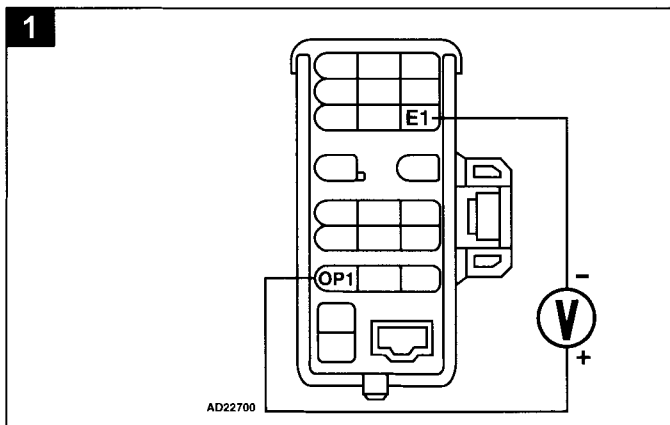
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an analogue voltmeter connected to the data link connector (DLC).

#### Accessing

- Ensure ignition switched OFF.
- Remove ignition key.
- Connect analogue voltmeter between data link connector (DLC) terminals as follows:
  - Connect voltmeter negative (-) terminal to DLC terminal E1 **1**.
  - Connect voltmeter positive (+) terminal to DLC terminal OP1 **1**.

**NOTE:** An LED with an activation current of 10-20 mA can also be used.

- Insert ignition key.
- Count voltmeter needle deflections. Note trouble codes. Compare with trouble code table.
- If no trouble codes are output: Check fuses.
- Each trouble code consists of two groups of one or more needle deflections **2**.
- A 1,5 second pause separates each trouble code group **2** [C].
- Voltmeter needle deflection duration: 0,5 second **2** [A].
- A 0,5 second pause separates each deflection **2** [B].
- A 2,5 second pause separates each trouble code **2** [D].
- A 4,5 second pause follows the last trouble code, before they are repeated.
- Rectify faults as necessary.



#### Erasing

- Rectifying faults erases trouble codes.



## Trouble code identification

NOTE: Trouble codes 11-22 DO NOT indicate a fault condition and should be output if conditions are met.

Flash type	Fault location	Probable cause
11	Ignition key inserted into ignition switch	NO code output: Wiring, ignition key warning switch, immobilizer control module
12	Any door is open	NO code output: Wiring, door contact switch, immobilizer control module
13	Ignition switched ON	NO code output: Wiring, IGN fuse, immobilizer control module
21	Master key (black) – inserted	Immobilizer deactivated
22	Sub key (grey) – inserted	Immobilizer deactivated
31	Ignition key – incorrect programming	Ignition key not matched
32	Ignition key – no communication	Wiring, immobilizer read coil, immobilizer read coil amplifier, immobilizer control module
33	Ignition key – incorrect signal	Ignition key not matched/damaged, immobilizer read coil amplifier, immobilizer control module
34	Immobilizer control module – insufficient memory	Immobilizer control module
51	Fuel shut-off solenoid control module – code learning	Normal code
52	Fuel shut-off solenoid control module – deactivated	Normal code
53	Fuel shut-off solenoid control module – incorrect signal	Wiring, immobilizer control module, fuel shut-off solenoid control module <b>1</b>
54	Fuel shut-off solenoid control module – incorrect signal	Wiring, immobilizer control module, fuel shut-off solenoid control module <b>1</b>
55	Fuel shut-off solenoid control module – incorrect signal	Wiring, immobilizer control module, fuel shut-off solenoid control module <b>1</b>
56	Fuel shut-off solenoid control module – incorrect signal	Wiring, immobilizer control module, fuel shut-off solenoid control module <b>1</b>
57	Fuel shut-off solenoid control module – defective	Wiring, immobilizer control module, fuel shut-off solenoid control module <b>1</b>
58	Fuel shut-off solenoid control module – not responding	Wiring, immobilizer control module, fuel shut-off solenoid control module <b>1</b>

**1** Diesel: The fuel shut-off solenoid control module and the immobilizer control module must be replaced as a set.



**TOYOTA**

Model:

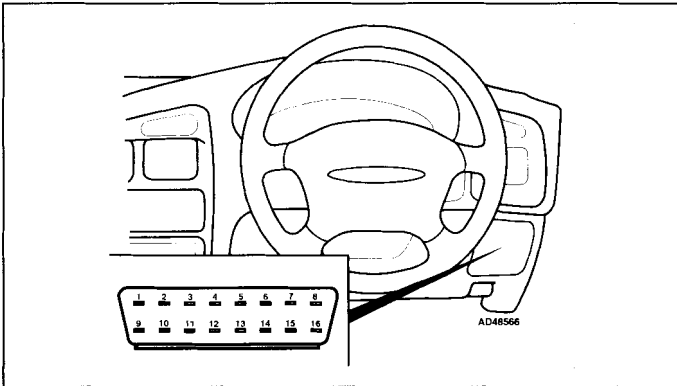
Avensis

Year:

1998-07/00

Immobilizer

## Data link connector (DLC) locations



Fascia

## Trouble codes

### General information

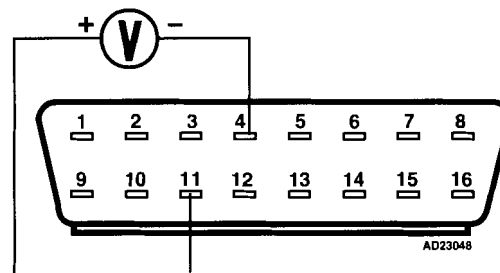
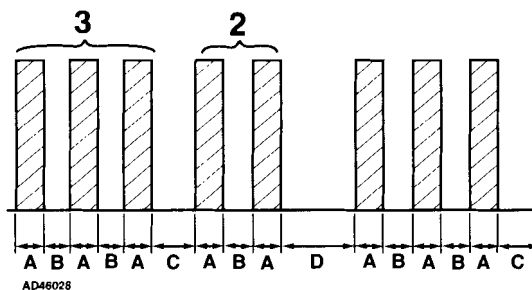
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an analogue voltmeter connected to the data link connector (DLC).

### Accessing

- Ensure ignition switched OFF.
- Remove ignition key.
- Connect analogue voltmeter between data link connector (DLC) terminals as follows:
  - Connect voltmeter negative (-) terminal to DLC terminal 4.
  - Connect voltmeter positive (+) terminal to DLC terminal 11 **1**.

**NOTE:** An LED with an activation current of 10-20 mA can also be used.

- Insert ignition key.
- Count voltmeter needle deflections. Note trouble codes. Compare with trouble code table.
- If no trouble codes are output: Check fuses.
- Each trouble code consists of two groups of one or more needle deflections **2**.
- A 1,5 second pause separates each trouble code group **2** [C].
- Voltmeter needle deflection duration: 0,5 second **2** [A].
- A 0,5 second pause separates each deflection **2** [B].
- A 2,5 second pause separates each trouble code **2** [D].
- A 4,5 second pause follows the last trouble code, before they are repeated.
- Rectify faults as necessary.

**1****2**

### Erasing

- Rectifying faults erases trouble codes.





### Trouble code identification

NOTE: Trouble codes 11-22 DO NOT indicate a fault condition and should be output if conditions are met.

Flash type	Fault location	Probable cause
11	Ignition key inserted into ignition switch	NO code output: Wiring, ignition key warning switch, immobilizer control module
12	Any door is open	NO code output: Wiring, door contact switch, immobilizer control module
13	Ignition switched ON	NO code output: Wiring, IGN fuse, immobilizer control module
21	Master key (black) – inserted	Immobilizer deactivated
22	Sub key (grey) – inserted	Immobilizer deactivated
31	Ignition key – incorrect programming	Ignition key not matched
32	Ignition key – no communication	Wiring, immobilizer read coil, immobilizer read coil amplifier, immobilizer control module
33	Ignition key – incorrect signal	Ignition key not matched/damaged, immobilizer read coil amplifier, immobilizer control module
34	Immobilizer control module – insufficient memory	Immobilizer control module



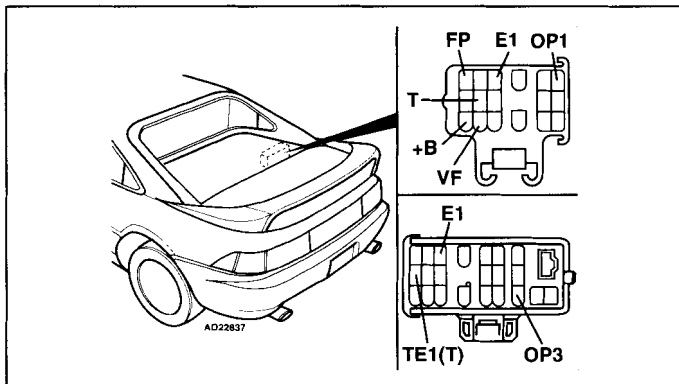


# TOYOTA

Model: **MR2**  
Year: **1990-99**

Immobilizer

## Data link connector (DLC) locations



RH engine bay

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an analogue voltmeter connected to the data link connector (DLC).

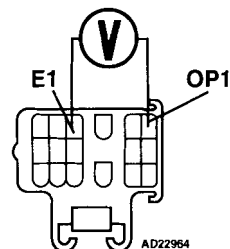
### Accessing

- Ensure ignition switched OFF.
- Remove ignition key.
- Connect analogue voltmeter between data link connector (DLC) terminals as follows:
- Connect voltmeter negative (-) terminal to DLC terminal E1.  
18-pin: **1**. 23-pin: **2**.
- Connect voltmeter positive (+) terminal to DLC terminal.  
18-pin: OP1 **1** 23-pin: OP3 **2**.

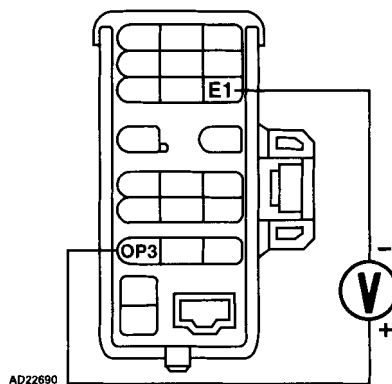
**NOTE:** An LED with an activation current of 10-20 mA can also be used.

- Insert ignition key.
- Count voltmeter needle deflections. Note trouble codes. Compare with trouble code table.
- If no trouble codes are output: Check fuses.
- Each trouble code consists of two groups of one or more needle deflections **3**.
- A 1,5 second pause separates each trouble code group **3** [C].
- Voltmeter needle deflection duration: 0,5 second **3** [A].
- A 0,5 second pause separates each deflection **3** [B].
- A 2,5 second pause separates each trouble code **3** [D].
- A 4,5 second pause follows the last trouble code, before they are repeated.
- Rectify faults as necessary.

1

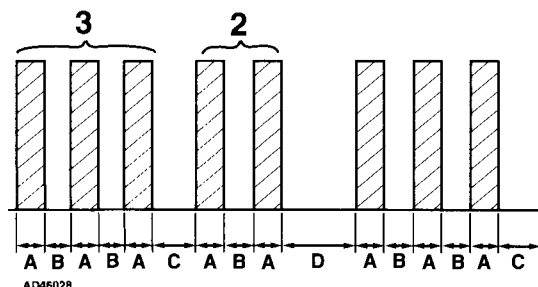


2





3



### Erasing

- Rectifying faults erases trouble codes.

### Trouble code identification

**NOTE:** Trouble codes 11-22 DO NOT indicate a fault condition and should be output if conditions are met.

Flash type	Fault location	Probable cause
11	Ignition key inserted into ignition switch	NO code output: Wiring, ignition key warning switch, immobilizer control module
12	Any door is open	NO code output: Wiring, door contact switch, immobilizer control module
13	Ignition switched ON	NO code output: Wiring, IGN fuse, immobilizer control module
21	Master key (black) – inserted	Immobilizer deactivated
22	Sub key (grey) – inserted	Immobilizer deactivated
31	Ignition key – incorrect programming	Ignition key not matched
32	Ignition key – no communication	Wiring, immobilizer read coil, immobilizer read coil amplifier, immobilizer control module
33	Ignition key – incorrect signal	Ignition key not matched/damaged, immobilizer read coil amplifier, immobilizer control module
34	Immobilizer control module – insufficient memory	Immobilizer control module





# TOYOTA

Model:

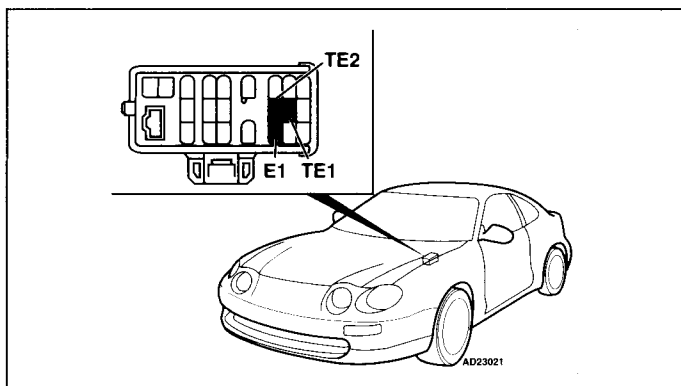
Celica

Year:

1995-99

Immobilizer

## Data link connector (DLC) locations



Underbonnet, LH

## Trouble codes

### General information

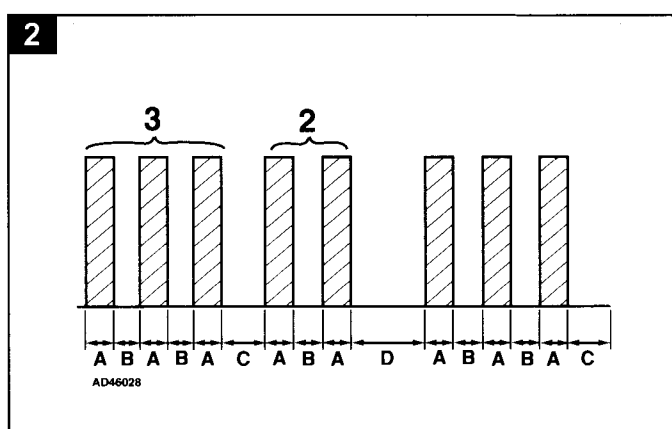
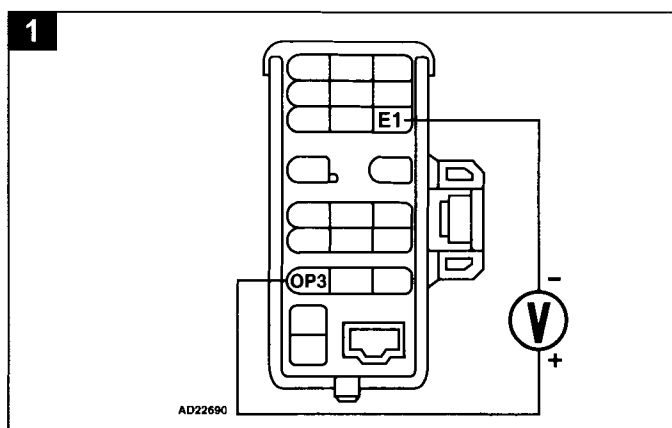
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an analogue voltmeter connected to the data link connector (DLC).

### Accessing

- Ensure ignition switched OFF.
- Remove ignition key.
- Connect analogue voltmeter between data link connector (DLC) terminals as follows:
  - Connect voltmeter negative (-) terminal to DLC terminal E1 **1**.
  - Connect voltmeter positive (+) terminal to DLC terminal OP3 **1**.

**NOTE:** An LED with an activation current of 10-20 mA can also be used.

- Insert ignition key.
- Count voltmeter needle deflections. Note trouble codes. Compare with trouble code table.
- If no trouble codes are output: Check fuses.
- Each trouble code consists of two groups of one or more needle deflections **2**.
- A 1,5 second pause separates each trouble code group **2** [C].
- Voltmeter needle deflection duration: 0,5 second **2** [A].
- A 0,5 second pause separates each deflection **2** [B].
- A 2,5 second pause separates each trouble code **2** [D].
- A 4,5 second pause follows the last trouble code, before they are repeated.
- Rectify faults as necessary.



### Erasing

- Rectifying faults erases trouble codes.



### Trouble code identification

NOTE: Trouble codes 11-22 DO NOT indicate a fault condition and should be output if conditions are met.

Flash type	Fault location	Probable cause
11	Ignition key inserted into ignition switch	NO code output: Wiring, ignition key warning switch, immobilizer control module
12	Any door is open	NO code output: Wiring, door contact switch, immobilizer control module
13	Ignition switched ON	NO code output: Wiring, IGN fuse, immobilizer control module
21	Master key (black) – inserted	Immobilizer deactivated
22	Sub key (grey) – inserted	Immobilizer deactivated
31	Ignition key – incorrect programming	Ignition key not matched
32	Ignition key – no communication	Wiring, immobilizer read coil, immobilizer read coil amplifier, immobilizer control module
33	Ignition key – incorrect signal	Ignition key not matched/damaged, immobilizer read coil amplifier, immobilizer control module
34	Immobilizer control module – insufficient memory	Immobilizer control module



**TOYOTA**

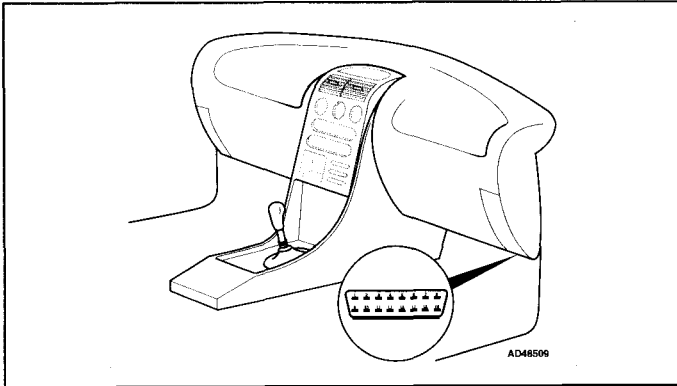
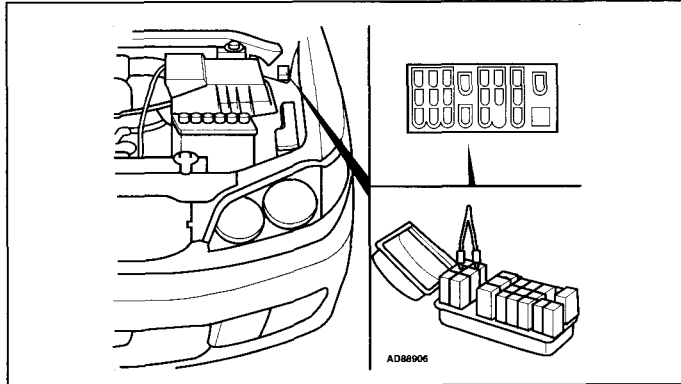
Model:

Picnic

Year:

1996-00

Immobilizer

**Data link connector (DLC) locations****Type 1 – under fascia****Type 2 – underbonnet, LH****Trouble codes****General information**

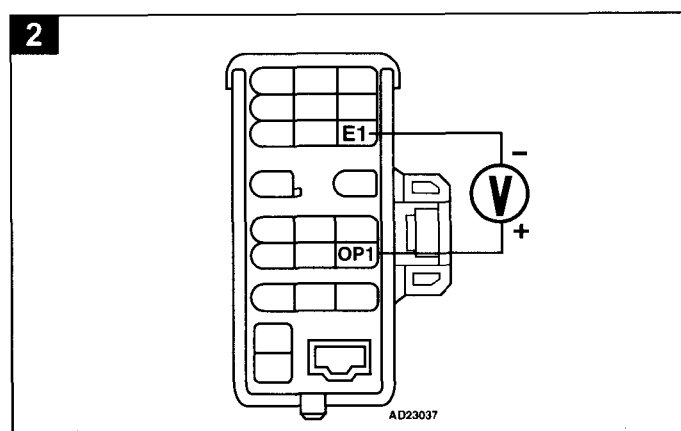
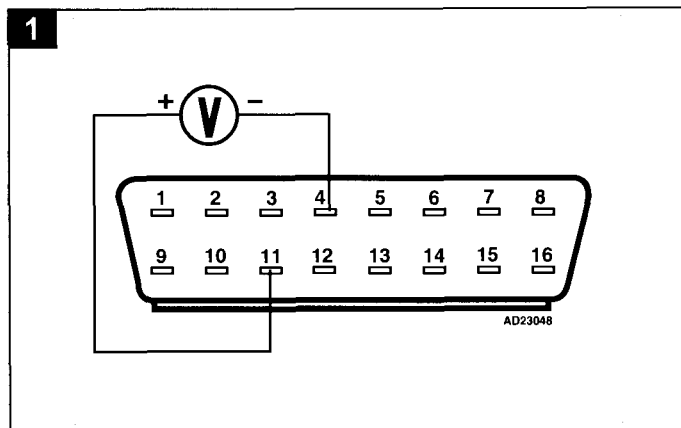
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an analogue voltmeter connected to the data link connector (DLC).

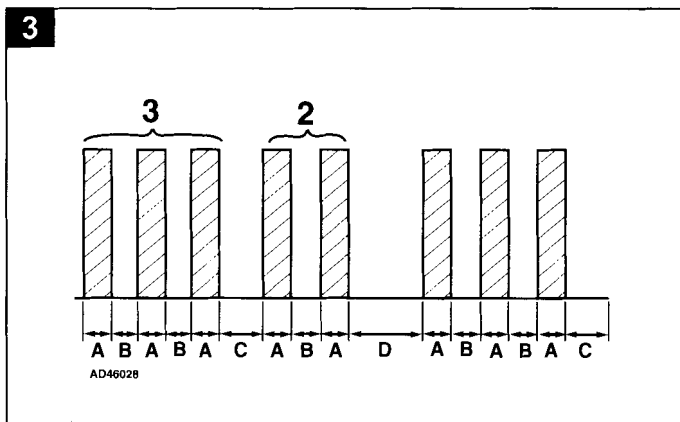
**Accessing**

- Ensure ignition switched OFF.
- Remove ignition key.
- Connect analogue voltmeter between data link connector (DLC) terminals as follows:
  - Type 1: Connect voltmeter negative (-) terminal to DLC terminal 4. Connect voltmeter positive (+) terminal to DLC terminal 11 **1**.
  - Type 2: Connect voltmeter negative (-) terminal to DLC terminal E1. Connect voltmeter positive (+) terminal to DLC terminal OP1 **2**.

**NOTE:** An LED with an activation current of 10-20 mA can also be used.

- Insert ignition key.
- Count voltmeter needle deflections. Note trouble codes. Compare with trouble code table.
- If no trouble codes are output: Check fuses.
- Each trouble code consists of two groups of one or more needle deflections **3**.
- A 1,5 second pause separates each trouble code group **3** [C].
- Voltmeter needle deflection duration: 0,5 second **3** [A].
- A 0,5 second pause separates each deflection **3** [B].
- A 2,5 second pause separates each trouble code **3** [D].
- A 4,5 second pause follows the last trouble code, before they are repeated.
- Rectify faults as necessary.





### Erasing

- Rectifying faults erases trouble codes.

### Trouble code identification

**NOTE:** Trouble codes 11-22 DO NOT indicate a fault condition and should be output if conditions are met.

Flash type	Fault location	Probable cause
11	Ignition key inserted into ignition switch	NO code output: Wiring, ignition key warning switch, immobilizer control module
12	Any door is open	NO code output: Wiring, door contact switch, immobilizer control module
13	Ignition switched ON	NO code output: Wiring, IGN fuse, immobilizer control module
21	Master key (black) – inserted	Immobilizer deactivated
22	Sub key (grey) – inserted	Immobilizer deactivated
31	Ignition key – incorrect programming	Ignition key not matched
32	Ignition key – no communication	Wiring, immobilizer read coil, immobilizer read coil amplifier, immobilizer control module
33	Ignition key – incorrect signal	Ignition key not matched/damaged, immobilizer read coil amplifier, immobilizer control module
34	Immobilizer control module – insufficient memory	Immobilizer control module





# TOYOTA

Model:

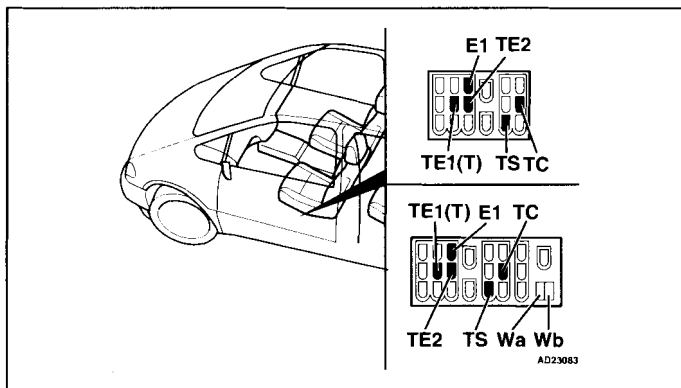
Previa

Year:

1996-04/00

Immobilizer

## Data link connector (DLC) locations



## Trouble codes

### General information

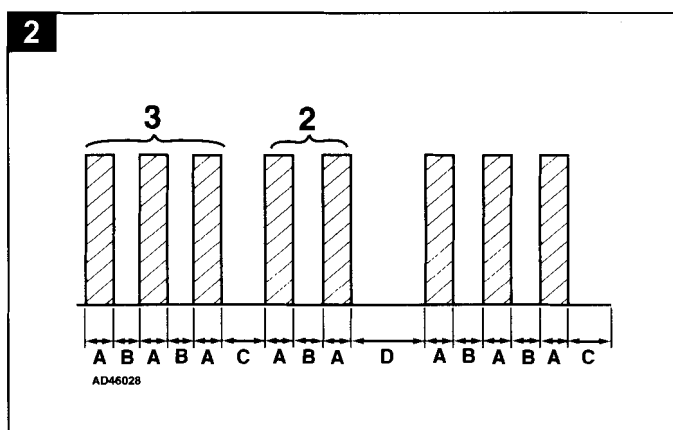
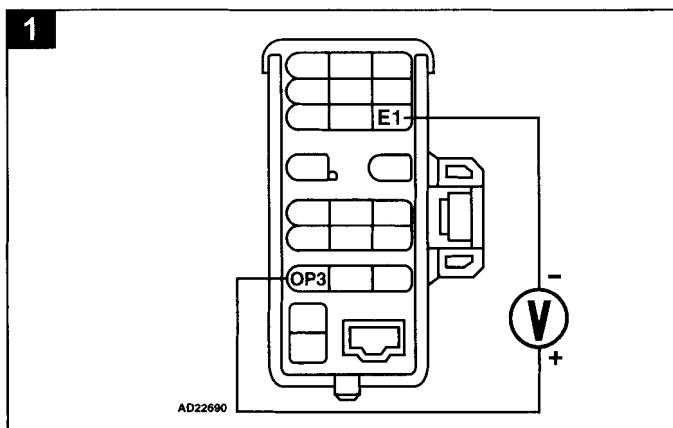
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an analogue voltmeter connected to the data link connector (DLC).

### Accessing

- Ensure ignition switched OFF.
- Remove ignition key.
- Connect analogue voltmeter between data link connector (DLC) terminals as follows:
  - Connect voltmeter negative (-) terminal to DLC terminal E1 **1**.
  - Connect voltmeter positive (+) terminal to DLC terminal OP3 **1**.

**NOTE:** An LED with an activation current of 10-20 mA can also be used.

- Insert ignition key.
- Count voltmeter needle deflections. Note trouble codes. Compare with trouble code table.
- If no trouble codes are output: Check fuses.
- Each trouble code consists of two groups of one or more needle deflections **2**.
- A 1,5 second pause separates each trouble code group **2** [C].
- Voltmeter needle deflection duration: 0,5 second **2** [A].
- A 0,5 second pause separates each deflection **2** [B].
- A 2,5 second pause separates each trouble code **2** [D].
- For example: Three 0,5 second flashes – 1,5 second pause – two 0,5 second flashes. Trouble code 32 displayed **2** – ignition key – no communication.
- A 4,5 second pause follows the last trouble code, before they are repeated.
- Rectify faults as necessary.



### Erasing

- Rectifying faults erases trouble codes.





### Trouble code identification

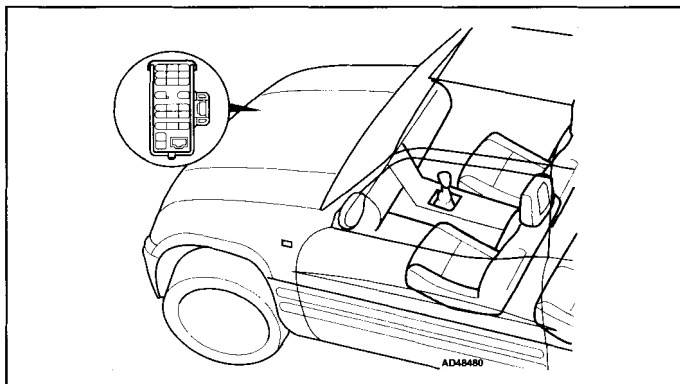
NOTE: Trouble codes 11-22 DO NOT indicate a fault condition and should be output if conditions are met.

Flash type	Fault location	Probable cause
11	Ignition key inserted into ignition switch	NO code output: Wiring, ignition key warning switch, immobilizer control module
12	Any door is open	NO code output: Wiring, door contact switch, immobilizer control module
13	Ignition switched ON	NO code output: Wiring, IGN fuse, immobilizer control module
21	Master key (black) – inserted	Immobilizer deactivated
22	Sub key (grey) – inserted	Immobilizer deactivated
31	Ignition key – incorrect programming	Ignition key not matched
32	Ignition key – no communication	Wiring, immobilizer read coil, immobilizer read coil amplifier, immobilizer control module
33	Ignition key – incorrect signal	Ignition key not matched/damaged, immobilizer read coil amplifier, immobilizer control module
34	Immobilizer control module – insufficient memory	Immobilizer control module



**TOYOTA**

Model: RAV4  
Year: 1995-00

**Immobilizer****Data link connector (DLC) locations****Trouble codes****General information**

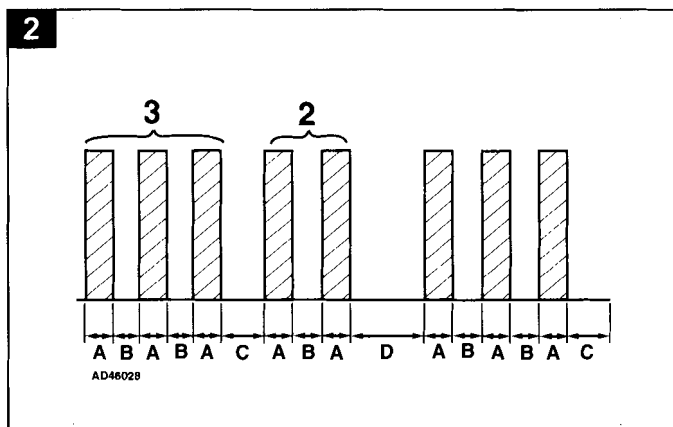
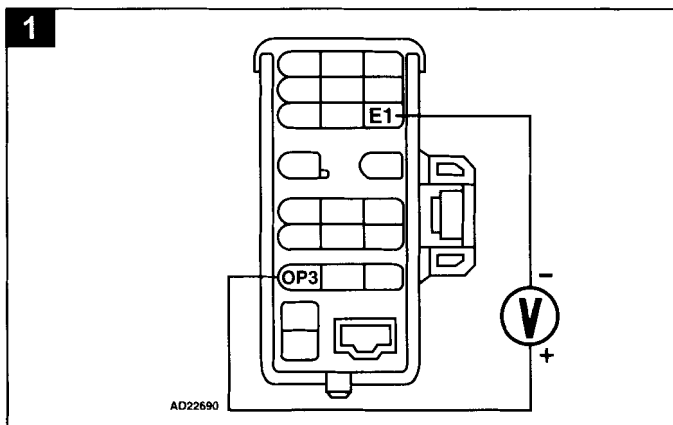
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an analogue voltmeter connected to the data link connector (DLC).

**Accessing**

- Ensure ignition switched OFF.
- Remove ignition key.
- Connect analogue voltmeter between data link connector (DLC) terminals as follows:
- Connect voltmeter negative (-) terminal to DLC terminal E1 **1**.
- Connect voltmeter positive (+) terminal to DLC terminal OP3 **1**.

**NOTE:** An LED with an activation current of 10-20 mA can also be used.

- Insert ignition key.
- Count voltmeter needle deflections. Note trouble codes. Compare with trouble code table.
- If no trouble codes are output: Check fuses.
- Each trouble code consists of two groups of one or more needle deflections **2**.
- A 1,5 second pause separates each trouble code group **2** [C].
- Voltmeter needle deflection duration: 0,5 second **2** [A].
- A 0,5 second pause separates each deflection **2** [B].
- A 2,5 second pause separates each trouble code **2** [D].
- For example: Three 0,5 second deflection – 1,5 second pause – two 0,5 second deflections. Trouble code 32 displayed **2** – ignition key – no communication.
- A 4,5 second pause follows the last trouble code, before they are repeated.
- Rectify faults as necessary.

**Erasing**

- Rectifying faults erases trouble codes.

Model: RAV4

**TOYOTA**



Immobilizer

## Trouble code identification

**NOTE:** Trouble codes 11-22 DO NOT indicate a fault condition and should be output if conditions are met.

Flash type	Fault location	Probable cause
11	Ignition key inserted into ignition switch	NO code output: Wiring, ignition key warning switch, immobilizer control module
12	Any door is open	NO code output: Wiring, door contact switch, immobilizer control module
13	Ignition switched ON	NO code output: Wiring, IGN fuse, immobilizer control module
21	Master key (black) – inserted	Immobilizer deactivated
22	Sub key (grey) – inserted	Immobilizer deactivated
31	Ignition key – incorrect programming	Ignition key not matched
32	Ignition key – no communication	Wiring, immobilizer read coil, immobilizer read coil amplifier, immobilizer control module
33	Ignition key – incorrect signal	Ignition key not matched/damaged, immobilizer read coil amplifier, immobilizer control module
34	Immobilizer control module – insufficient memory	Immobilizer control module



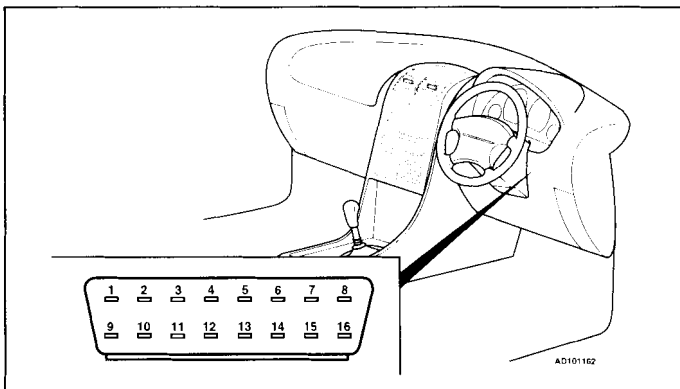


# VAUXHALL-OPEL

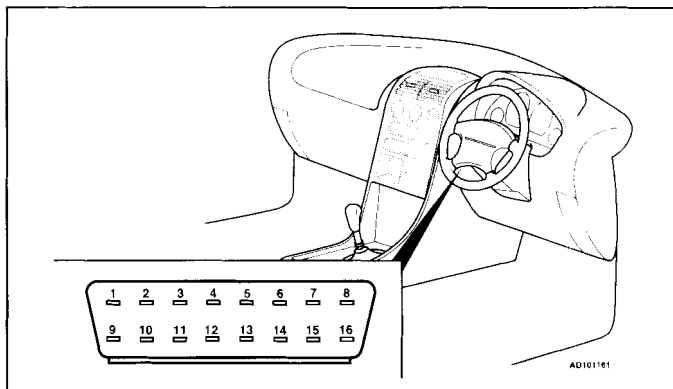
Model: Agila 1,0/1,2 • Astra-G 1,2 • Astra-G 2,0 Turbo  
Speedster/VX220 2,0 Turbo • Vectra-C 1,8/3,2  
Year: 2000-04  
Engine code: Z10XE, Z12XE, Z18XE, Z18XEL, Z20LET, Z32SE  
System: Bosch Motronic ME1.5.5/M3.11  
Siemens Simtec 71.5

## Engine management

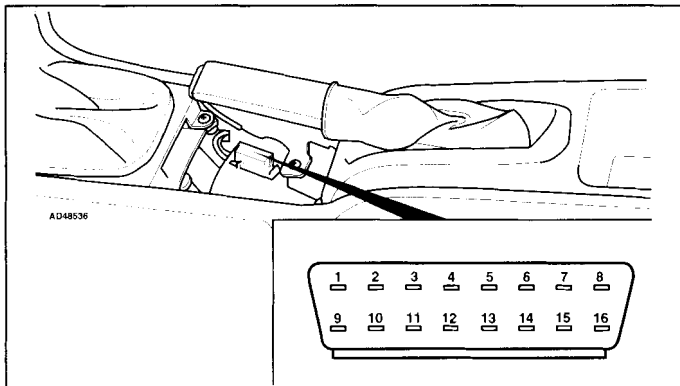
### Data link connector (DLC) locations



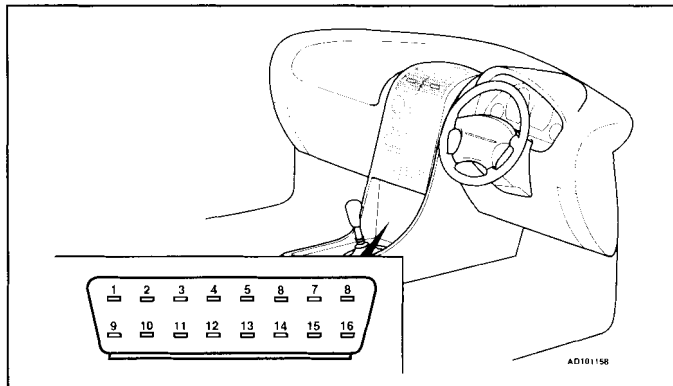
Agila



Speedster/VX220



Astra-G



Vectra-C

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).



### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1105	Barometric pressure (BARO) sensor – circuit malfunction	Wiring, BARO sensor
P1106	Manifold absolute pressure (MAP) sensor – circuit malfunction	Wiring, MAP sensor, ECM
P1110	Intake manifold air control solenoid 1 – circuit malfunction	Wiring, intake manifold air control solenoid
P1111	Intake manifold air control solenoid 2 – circuit malfunction	Wiring, intake manifold air control solenoid
P1120	Accelerator pedal position (APP) sensor A – circuit malfunction	Wiring, APP sensor
P1122	Accelerator pedal position (APP) sensor B – circuit malfunction	Wiring, APP sensor
P1130	Heated oxygen sensor (HO2S) 1, bank 1 – malfunction	Wiring, HO2S
P1170	Mixture control (MC), bank 1 – malfunction	Fuel system, intake system
P1230	Engine control relay – circuit malfunction	Wiring, engine control relay
P1243	Turbocharger (TC) regulating solenoid – circuit malfunction	Wiring, TC regulating solenoid, ECM
P1300	Fuel tank empty	Wiring, fuel gauge tank sensor, fuel tank empty
P1326	Knock control, cylinder 1 – control limit reached	Wiring, knock sensor (KS), ECM
P1327	Knock control, cylinder 2 – control limit reached	Wiring, knock sensor (KS), ECM
P1328	Knock control, cylinder 3 – control limit reached	Wiring, knock sensor (KS), ECM
P1329	Knock control, cylinder 4 – control limit reached	Wiring, knock sensor (KS), ECM
P1372	Crankshaft position (CKP) sensor – malfunction	Wiring, CKP sensor
P1405	Exhaust gas recirculation (EGR) valve position sensor – malfunction	Wiring, EGR valve position sensor
P1481	Engine coolant blower motor relay 1 – malfunction	Wiring, engine coolant blower motor relay
P1482	Engine coolant blower motor relay 2 – malfunction	Wiring, engine coolant blower motor relay
P1483	Engine coolant blower motor relay 3 – malfunction	Wiring, engine coolant blower motor relay
P1490	Auxiliary cooling pump relay – circuit malfunction	Wiring, auxiliary cooling pump relay, ECM
P1500	Electronic throttle system (ETS) – motor malfunction	Throttle motor, ETS, ECM
P1501	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1502	Immobilizer control module – no signal	Wiring, immobilizer control module
P1503	Immobilizer control module – incorrect signal	Immobilizer control module, incorrect key
P1510	Closed throttle position (CTP) switch – circuit malfunction	Wiring, CTP switch
P1515	Idle air control (IAC) valve – circuit malfunction	Wiring, IAC valve
P1520	Electronic throttle system (ETS) – supply voltage	Wiring, ECM
P1523	Electronic throttle system (ETS) – malfunction	Wiring, ETS
P1525	Electronic throttle system (ETS), limp home position – malfunction	Wiring, ETS
P1526	Electronic throttle system (ETS), adaptation – malfunction	Wiring, ETS
P1530	AC cut-off relay – circuit malfunction	Wiring, AC cut-off relay, ECM
P1540	AC refrigerant pressure sensor – circuit malfunction	Wiring, AC refrigerant pressure sensor, ECM
P1550	Electronic throttle system (ETS) – in emergency mode	ETS, other trouble codes



**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1551	Electronic throttle system (ETS), engine torque monitoring – continuously above limit	Wiring, ETS, ECM
P1555	Throttle position (TP) sensor A/mass air flow (MAF) sensor – implausible signal	Air leak, blocked hose
P1560	System voltage, battery – out of limits	Wiring, battery, alternator
P1571	Brake pedal position (BPP) switch – circuit malfunction	Wiring, BPP switch
P1600	Engine control module (ECM) – program malfunction	ECM programming
P1602	Knock control – RAM malfunction	ECM
P1606	Engine control module (ECM) – defective	ECM
P1610	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1611	Immobilizer control module – coding	Immobilizer control module incorrect code entered
P1612	Immobilizer control module – incorrect/no signal	Immobilizer control module
P1613	Immobilizer control module – incorrect/no signal	Immobilizer control module
P1614	Immobilizer control module – incorrect signal	Incorrect key
P1615	Immobilizer control module/body control module – incorrect signal	Immobilizer control module, body control module
P1616	Immobilizer control module/instrumentation control module – incorrect signal	Immobilizer control module, instrumentation control module
P1620	Engine control module (ECM), 5 V output voltage – circuit malfunction	Wiring, throttle control unit, APP sensor
P1650	Service indicator – circuit malfunction	Wiring, service indicator
P1690	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, MIL
P1700	Transmission control module (TCM), MIL request – malfunction	ECM, TCM
P1740	AT torque control, signal – malfunction	Wiring, ECM, TCM
P1813	AT torque control, signal – malfunction	Wiring, ECM, TCM
P1845	AT torque control, signal – malfunction	Wiring, ECM, TCM
P1890	CAN data bus, ECM/TCM communication – malfunction detected	Wiring, ECM, TCM
U2100	CAN data bus – circuit malfunction	Wiring
U2101	CAN data bus – program malfunction	ECM programming
U2103	Engine control module (ECM), CAN data bus – malfunction detected	Wiring
U2104	Engine control module (ECM), CAN data bus – malfunction detected	Wiring
U2106	Engine control module (ECM)/transmission control module (TCM) communication, CAN data bus – malfunction	Wiring
U2107	Engine control module (ECM)/multifunction control module communication, CAN data bus – malfunction	Wiring
U2108	Engine control module (ECM)/ABS control module/traction control module communication, CAN data bus – malfunction	Wiring



Model: Corsa/Nova 1,2/1,4/1,6  
 Corsa-B/Combo 1,2/1,4/1,6 • Astra-F 1,4/1,6/1,8  
 Vectra/Cavalier 1,6/1,8 • Tigra 1,4/1,6

Year: 1988-00

Engine code: 14SE, C12NZ, C14NZ, C14NZ, C14SE, C16NZ,  
 C16NZ/2, C16SE, C16XE, C18NZ, X12SZ, X14NZ,  
 X14SZ, X14XE, X16SZ, X16SZR, X16XE, X16XEL

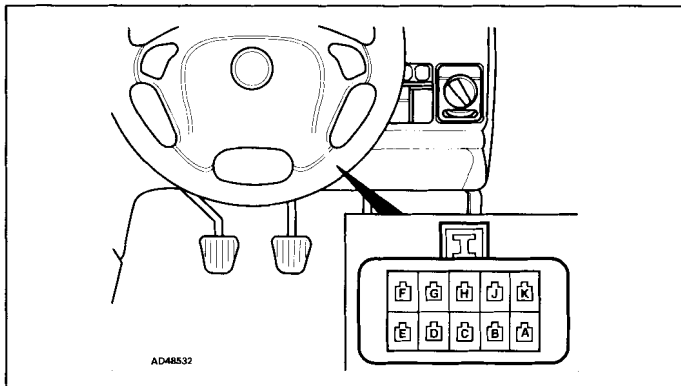
System: Multec

**OPEL-VAUXHALL**

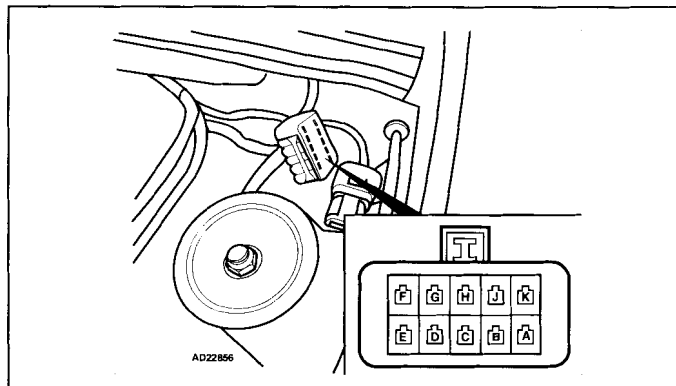


Engine management

## Data link connector (DLC) locations



Except Cavalier/Vectra



Cavalier/Vectra

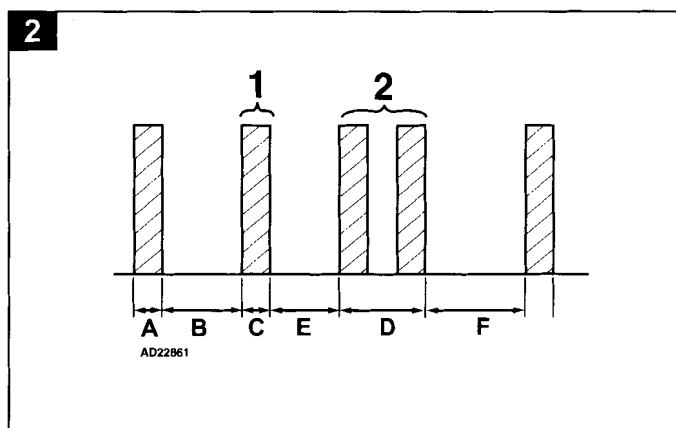
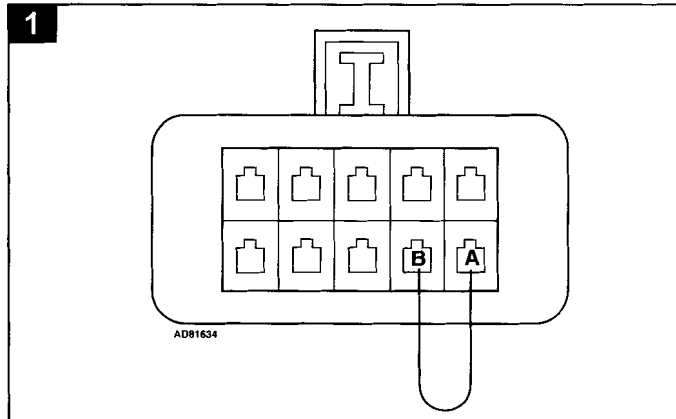
## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals A and B **1**.
- Switch ignition ON.
- Trouble codes will be displayed after a short flash **2** [A] and a long pause **2** [B].
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of two groups of one or more flashes.
- The first group of flashes indicate the 'tens' of the trouble code **2** [C].
- The second group of flashes indicate the 'units' of the trouble code **2** [D].
- A short pause separates each trouble code group **2** [E].
- A long pause separates each trouble code **2** [F].
- For example: Trouble code 12 displayed **2**.
- Each trouble code including 12 displayed three times.



**Engine management****Erasing**

**NOTE:** Some models 1992 → may require diagnostic equipment to erase trouble codes.

- Switch ignition OFF.
- Disconnect battery earth lead for 60 seconds.

**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.

**Trouble code identification**

Flash type	Fault location	Probable cause
12	Start and end of diagnosis	–
13	Heated oxygen sensor (HO2S)/oxygen sensor (O2S) – open circuit	Wiring, HO2S/O2S, ECM
14	Engine coolant temperature (ECT) sensor – voltage low	Wiring short to earth, ECT sensor, ECM
15	Engine coolant temperature (ECT) sensor – voltage high	Wiring short to positive, ECT sensor, ECM
16	Knock sensor (KS) 1 – signal	Wiring, KS
17	Injector(s) – circuit malfunction	Wiring, injectors, ECM
18	Engine control module (ECM) – KS control	Internal KS control failure
19	Engine speed (RPM) sensor – incorrect signal	Wiring, RPM sensor, reluctor ring, ECM
21	Throttle position (TP) sensor – voltage high	Wiring short to positive, TP sensor, ECM
22	Throttle position (TP) sensor – voltage low	Wiring short to earth, TP sensor, ECM
24	Vehicle speed sensor (VSS) – no signal	Wiring, VSS, ECM
25	Injector(s) – voltage low	Wiring short to earth, injector, ECM
28	Fuel pump relay – circuit malfunction	Wiring, fuel pump relay, fuel pump, ECM
29	Fuel pump relay – voltage low	Wiring short to earth, fuel pump relay, fuel pump, ECM
32	Fuel pump relay – voltage high	Wiring short to positive, fuel pump relay, fuel pump, ECM
33	Manifold absolute pressure (MAP) sensor – voltage high	Wiring short to positive, MAP sensor, ECM
34	Manifold absolute pressure (MAP) sensor – voltage low	Wiring short to earth, MAP sensor, ECM
35	Engine control module (ECM), idle speed control – idle speed incorrect	Intake system, fuel system
41	Engine control module (ECM), ignition signal cyl. 2 & 3 – voltage high	Wiring
42	Engine control module (ECM), ignition signal cyl. 1 & 4 – DI – voltage high	Wiring
	Engine control module (ECM), ignition signal – except DI – voltage high	Wiring
43	Exhaust gas recirculation (EGR) solenoid – circuit malfunction	Wiring, EGR solenoid, ECM
44	Heated oxygen sensor (HO2S) – mixture weak	Wiring, HO2S, ECM
45	Heated oxygen sensor (HO2S) – mixture rich	Wiring, HO2S, ECM
46	Engine control module (ECM), ignition signal – voltage high	Wiring short to positive



Model: Corsa/Nova 1,2/1,4/1,6 • Corsa-B/Combo 1,2/1,4/1,6  
Astra-F 1,4/1,6/1,8 • Vectra/Cavalier 1,6/1,8 • Tigra 1,4/1,6

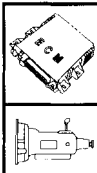
**OPEL-VAUXHALL**



Engine management

Flash type	Fault location	Probable cause
47	Exhaust gas recirculation (EGR) valve position sensor – circuit malfunction	Wiring, EGR valve position sensor, ECM
49	Battery supply voltage – high	Alternator, regulator
51	Engine control module (ECM) – incorrect programming	Wiring, ECM
52	Secondary air injection (AIR) pump relay – voltage low	Wiring short to earth, AIR pump relay, ECM
53	Secondary air injection (AIR) pump relay – voltage high	Wiring short to positive, AIR pump relay, ECM
55	Engine control module (ECM) – defective	ECM
56	Secondary air injection (AIR) solenoid – voltage low	Wiring short to earth, AIR solenoid, ECM
57	Secondary air injection (AIR) solenoid – voltage high	Wiring short to positive, AIR solenoid, ECM
61	Evaporative emission (EVAP) canister purge valve – voltage low	Wiring short to earth, EVAP canister purge valve, ECM
62	Evaporative emission (EVAP) canister purge valve – voltage high	Wiring short to positive, EVAP canister purge valve, ECM
63	Engine control module (ECM), ignition signal cyl. 2 & 3 – voltage low	Wiring short to earth
64	Engine control module (ECM), ignition signal cyl. 1 & 4 – voltage low	Wiring short to earth
66	Manifold absolute pressure (MAP) sensor – incorrect signal	MAP sensor, air leak, ECM
67	Mass air flow (MAF) sensor – incorrect signal	Wiring, MAF sensor, ECM
68	Mass air flow (MAF) sensor – voltage low	Wiring short to earth, MAF sensor, ECM
69	Intake air temperature (IAT) sensor – voltage low	Wiring short to earth, IAT sensor, ECM
71	Intake air temperature (IAT) sensor – voltage high	Wiring short to positive, IAT sensor, ECM
72	Engine control module (ECM), ignition signal – open circuit	Wiring
75	AT torque control, signal – voltage low	Wiring open circuit
76	AT torque control, signal – continuous	Wiring, ECM, TCM
81	Injector – voltage high	Wiring short to positive, injector, ECM
83	Immobilizer control module – programming	Immobilizer control module incorrectly programmed
84	Immobilizer control module – no signal	Immobilizer control module
85	Immobilizer control module – incorrect signal	Immobilizer control module
87	AC control signal – voltage low	Wiring short to earth, AC cut-off relay, ECM
88	AC control signal – voltage high	Wiring short to positive, AC cut-off relay, ECM
92	Camshaft position (CMP) sensor – incorrect signal	Wiring, CMP sensor
93	Engine control module (ECM), MIL/RPM/fuel consumption signal(s) – circuit malfunction	Wiring, ECM





# VAUXHALL-OPEL

Corsa-B/Combo 1,0/1,2 • Corsa-C 1,0/1,2/1,4/1,6/1,8 • Combo-C 1,6 • Astra-G 1,2/1,4/1,6/1,8  
Vectra-B 1,6/1,8/2,2/2,5/2,6 • Omega-B 2,2/2,6/3,0/3,2 • Sintra 3,0 • Zafira 1,6/1,8/2,0/2,2  
Frontera-B 2,2/3,2

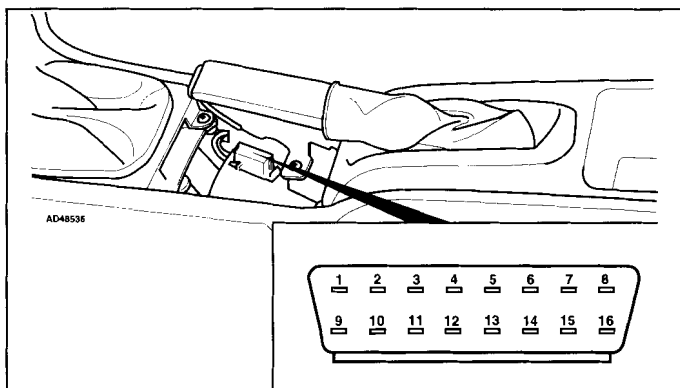
Year: 1995-04

Engine code: X10XE, X12XE, X22SE, X25XE, X30XE, Y16XE, Y22XE, Y26SE, Y32SE, Z10XE, Z12XE, Z14XE, Z16SE, Z16XE, Z16XEP, Z16YNG, Z18XE, Z18XEL, Z20LET, Z22XE, Z22SE, 6VD1

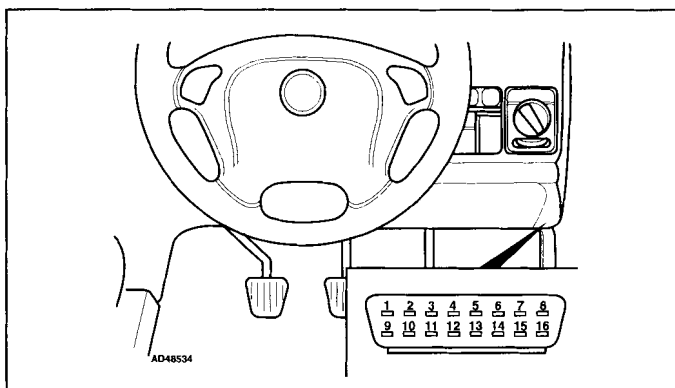
System: Multec S(F) • Motronic M1.5.5/ME1.5.5/M2.8.1/M2.8.3/ME3.1.1 • Simtec 71 • GMPT-E15

Engine management/transmission

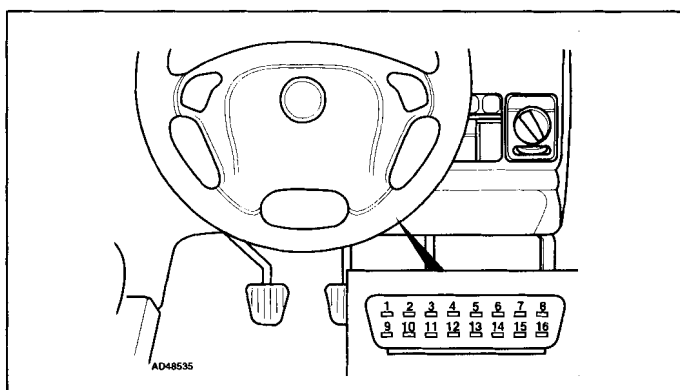
## Data link connector (DLC) locations



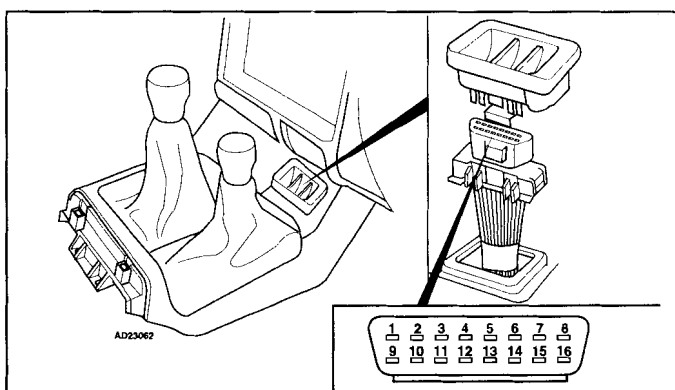
Corsa-C/Astra-G/Vectra-B/Zafira



Sintra



Corsa-B/Omega-B



Frontera

## Trouble codes

### General information

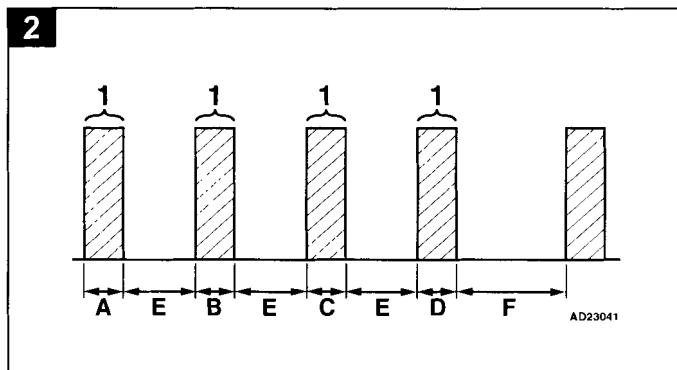
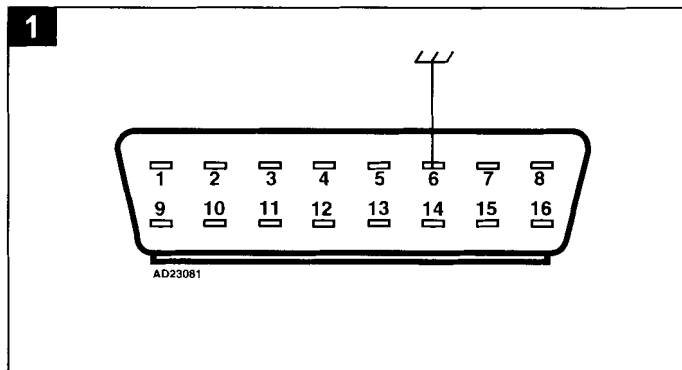
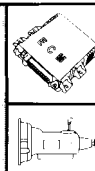
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

### Accessing

**NOTE:** Models without a terminal in position 6 of the 16-pin DLC do not display trouble codes using the MIL. Diagnostic equipment required.

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 6 and earth **1**.
- Switch ignition ON.

- Trouble codes will be displayed in groups of flashes.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of four groups of one or more flashes.
- The first group of flashes indicate the 'thousands' of the trouble code **2** [A].
- The second group of flashes indicate the 'hundreds' of the trouble code **2** [B].
- The third group of flashes indicate the 'tens' of the trouble code **2** [C].
- The fourth group of flashes indicate the 'units' of the trouble code **2** [D].
- Ten flashes in a group indicate '0'.
- A short pause separates each trouble code group **2** [E].
- A long pause separates each trouble code **2** [F].
- For example: Trouble code P1111 displayed **2**.

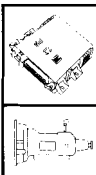


### Erasing

- The engine control module (ECM) fault memory can only be erased using diagnostic equipment connected to the data link connector (DLC).
- Repeat checking procedure to ensure no data remains in ECM fault memory.

### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1110	Intake manifold air control solenoid 1 – circuit malfunction	Wiring, intake manifold air control solenoid
P1111	Intake manifold air control solenoid 2 – circuit malfunction	Wiring, intake manifold air control solenoid
P1120	Accelerator pedal position (APP) sensor A – circuit malfunction	Wiring, APP sensor
P1122	Accelerator pedal position (APP) sensor B – circuit malfunction	Wiring, APP sensor
P1130	Heated oxygen sensor (HO2S) 1, bank 1 – malfunction	Wiring, HO2S
P1170	Mixture control (MC), bank 1 – malfunction	Fuel system, intake system
P1230	Engine control relay – circuit malfunction	Wiring, engine control relay
P1300	Fuel tank empty	Wiring, fuel gauge tank sensor, fuel tank empty
P1326	Knock control, cylinder 1 – control limit reached	Wiring, knock sensor (KS), ECM
P1327	Knock control, cylinder 2 – control limit reached	Wiring, knock sensor (KS), ECM
P1328	Knock control, cylinder 3 – control limit reached	Wiring, knock sensor (KS), ECM
P1329	Knock control, cylinder 4 – control limit reached	Wiring, knock sensor (KS), ECM
P1372	Crankshaft position (CKP) sensor – malfunction	Wiring, CKP sensor
P1405	Exhaust gas recirculation (EGR) valve position sensor – malfunction	Wiring, EGR valve position sensor
P1481	Engine coolant blower motor relay 1 – malfunction	Wiring, engine coolant blower motor relay
P1482	Engine coolant blower motor relay 2 – malfunction	Wiring, engine coolant blower motor relay
P1483	Engine coolant blower motor relay 3 – malfunction	Wiring, engine coolant blower motor relay
P1500	Electronic throttle system (ETS) – circuit malfunction	Wiring, ETS, ECM
P1501	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1502	Immobilizer control module – no signal	Wiring, immobilizer control module
P1503	Immobilizer control module – incorrect signal	Immobilizer control module, incorrect key
P1510	Closed throttle position (CTP) switch – circuit malfunction	Wiring, CTP switch
P1515	Idle air control (IAC) valve – circuit malfunction	Wiring, IAC valve
P1520	Electronic throttle system (ETS) – supply voltage	Wiring, ECM
P1523	Electronic throttle system (ETS) – malfunction	Wiring, ETS



# VAUXHALL-OPEL

Model: Corsa-B/Combo • Corsa-C • Combo-C • Astra-G • Vectra-B  
Omega-B • Sintra 3,0 • Zafira • Frontera-B

## Engine management/transmission

EOBD type	Fault location	Probable cause
P1525	Electronic throttle system (ETS), limp home position – malfunction	Wiring, ETS
P1526	Electronic throttle system (ETS), adaptation – malfunction	Wiring, ETS
P1530	AC cut-off relay – circuit malfunction	Wiring, AC cut-off relay, ECM
P1540	AC refrigerant pressure sensor – circuit malfunction	Wiring, AC refrigerant pressure sensor, ECM
P1550	Electronic throttle system (ETS) – in emergency mode	ETS, other trouble codes
P1551	Electronic throttle system (ETS), engine torque monitoring – continuously above limit	Wiring, ETS, ECM
P1555	Throttle position (TP) sensor A/mass air flow (MAF) sensor – implausible signal	Air leak, blocked hose
P1560	System voltage, battery – out of limits	Wiring, battery, alternator
P1571	Brake pedal position (BPP) switch – circuit malfunction	Wiring, BPP switch
P1600	Engine control module (ECM) – program malfunction	ECM programming
P1602	Knock control – RAM malfunction	ECM
P1606	Engine control module (ECM) – defective	ECM
P1610	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1611	Immobilizer control module – coding	Immobilizer control module incorrect code entered
P1612	Immobilizer control module – incorrect/no signal	Immobilizer control module
P1613	Immobilizer control module – incorrect/no signal	Immobilizer control module
P1614	Immobilizer control module – incorrect signal	Incorrect key
P1615	Immobilizer control module/body control module (BCM) – incorrect signal	Immobilizer control module, body control module
P1616	Immobilizer control module/instrumentation control module – incorrect signal	Immobilizer control module, instrumentation control module
P1620	Engine control module (ECM), 5 V output voltage – circuit malfunction	Wiring, throttle control unit, APP sensor
P1650	Service indicator – circuit malfunction	Wiring, service indicator
P1690	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, MIL
P1700	Transmission control module (TCM), MIL request – malfunction	ECM, TCM
P1740	AT torque control, signal – malfunction	Wiring, ECM, TCM
P1813	AT torque control, signal – malfunction	Wiring, ECM, TCM
P1845	AT torque control, signal – malfunction	Wiring, ECM, TCM
P1890	CAN data bus, ECM/TCM communication – malfunction detected	Wiring, ECM, TCM
U2100	CAN data bus – circuit malfunction	Wiring
U2101	CAN data bus – program malfunction	ECM programming
U2103	Engine control module (ECM), CAN data bus – malfunction detected	Wiring
U2104	Engine control module (ECM), CAN data bus – malfunction detected	Wiring
U2106	Engine control module (ECM)/transmission control module (TCM) communication, CAN data bus – malfunction	Wiring
U2107	Engine control module (ECM)/multifunction control module communication, CAN data bus – malfunction	Wiring
U2108	Engine control module (ECM)/ABS control module/traction control module communication, CAN data bus – malfunction	Wiring



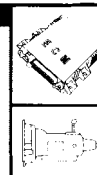
Model: Corsa-B/Combo 1,4/1,6 • Tigra 1,4/1,6  
Astra-F 1,4/1,6/1,8/2,0 • Astra-G 1,4/1,6/1,8/2,0  
Vectra-B 1,6/1,8/2,0 • Omega-B 2,0  
Zafira 1,6/1,8

Year: 1994-00

Engine code: C14SEL, C16SEL, C18SEL, C20SEL, X14SZ,  
X14XE, X16SEJ, X16SZR, X16XE, X16XEL, X18E1,  
X18XE, X18XE1, X20XEV

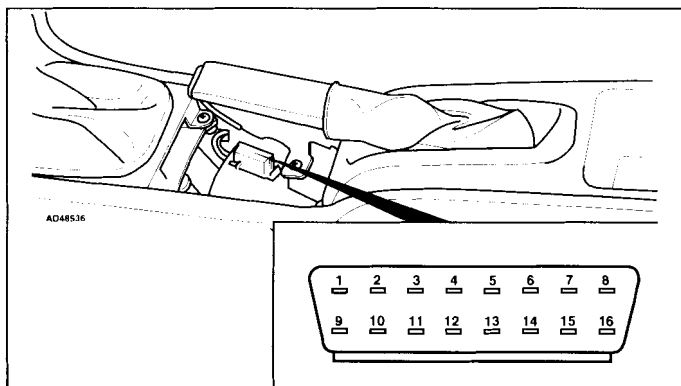
System: Multec • Simtec 56.5/70

# OPEL-VAUXHALL

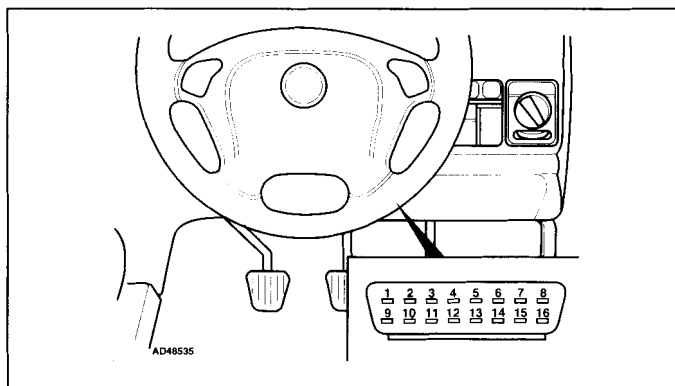


Engine management/transmission

## Data link connector (DLC) locations



Astra-G/Vectra-B/Zafira



Corsa-B/Combo/Astra-F/Omega-B/Tigra

## Trouble codes

### General information

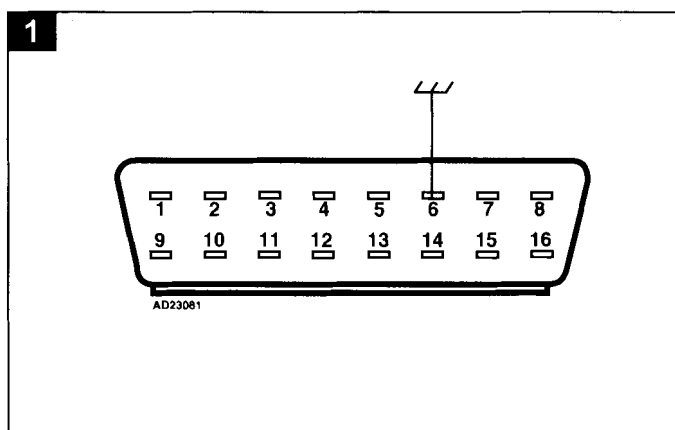
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

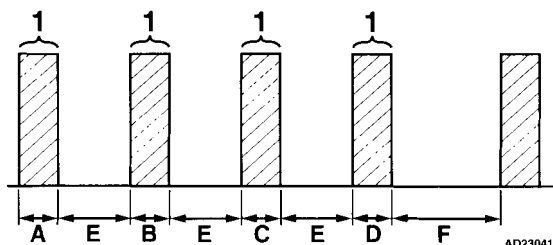
### Accessing

**NOTE:** Models without a terminal in position 6 of the 16-pin DLC do not display trouble codes using the MIL. Diagnostic equipment required.

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 6 and earth **1**.
- Switch ignition ON.
- Trouble codes will be displayed in groups of flashes.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of four groups of one or more flashes.
- The first group of flashes indicate the 'thousands' of the trouble code **2** [A].
- The second group of flashes indicate the 'hundreds' of the trouble code **2** [B].
- The third group of flashes indicate the 'tens' of the trouble code **2** [C].
- The fourth group of flashes indicate the 'units' of the trouble code **2** [D].

- Ten flashes in a group indicate '0'.
- A short pause separates each trouble code group **2** [E].
- A long pause separates each trouble code **2** [F].
- For example: Trouble code P1111 displayed **2**.



**2****Erasing**

- The engine control module (ECM) fault memory can only be erased using diagnostic equipment connected to the data link connector (DLC).
- Repeat checking procedure to ensure no data remains in ECM fault memory.

**Trouble code identification**

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1110	Intake manifold air control solenoid 1 – circuit malfunction	Wiring, intake manifold air control solenoid
P1120	Throttle position (TP) sensor/manifold absolute pressure (MAP) sensor – implausible signal	Air leak, MAP sensor/hose
P1171	Mixture control (MC), engine under load – mixture lean	Fuel system, intake system
P1229	Engine control relay – voltage high	Wiring, engine control relay
P1230	Engine control relay – voltage low	Wiring, engine control relay
P1231	Fuel pump relay	Wiring, fuel pump relay
P1326	Knock control, cylinder 1 – control limit reached	Wiring, knock sensor (KS), ECM
P1327	Knock control, cylinder 2 – control limit reached	Wiring, knock sensor (KS), ECM
P1328	Knock control, cylinder 3 – control limit reached	Wiring, knock sensor (KS), ECM
P1329	Knock control, cylinder 4 – control limit reached	Wiring, knock sensor (KS), ECM
P1404	Exhaust gas recirculation (EGR) valve – range/performance problem	Wiring, EGR valve
P1405	Exhaust gas recirculation (EGR) valve position sensor – malfunction	Wiring, EGR valve position sensor
P1410	Secondary air injection (AIR) pump relay – circuit malfunction	Wiring, AIR pump relay
P1481	Engine coolant blower motor relay 1 – malfunction	Wiring, engine coolant blower motor relay
P1482	Engine coolant blower motor relay 2 – malfunction	Wiring, engine coolant blower motor relay
P1483	Engine coolant blower motor relay 3 – malfunction	Wiring, engine coolant blower motor relay
P1501	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1502	Immobilizer control module – no signal	Wiring, immobilizer control module
P1503	Immobilizer control module – incorrect signal	Immobilizer control module, incorrect key
P1508	Idle air control (IAC) valve – circuit malfunction	Wiring open circuit/short to earth, IAC valve
P1509	Idle air control (IAC) valve – circuit malfunction	Wiring short to positive, IAC valve
P1510	Closed throttle position (CTP) switch – circuit malfunction	Wiring, CTP switch
P1515	Idle air control (IAC) valve – circuit malfunction	Wiring, IAC valve
P1530	AC cut-off relay – circuit malfunction	Wiring, AC cut-off relay, ECM



EOBD type	Fault location	Probable cause
P1540	AC refrigerant pressure sensor – circuit malfunction	Wiring, AC refrigerant pressure sensor, ECM
P1546	AC compressor clutch, signal – circuit malfunction	Wiring
P1560	System voltage, battery – out of limits	Wiring, battery, alternator
P1571	Brake pedal position (BPP) switch – circuit malfunction	Wiring, BPP switch
P1600	Engine control module (ECM) – program error	ECM programming
P1601	Module temperature switch, ECM – temperature high	Wiring, module temperature switch, ECM overheating
P1602	Knock control – RAM error	ECM
P1604	Engine control module (ECM) – defective	ECM
P1605	Engine control module (ECM) – coding	ECM programming
P1610	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1611	Immobilizer control module – incorrect security code entered	Immobilizer control module programming
P1612	Immobilizer control module – no/incorrect signal	Wiring, immobilizer control module
P1613	Immobilizer control module – no/incorrect signal	Wiring, immobilizer control module
P1614	Immobilizer control module – incorrect signal	Incorrect key
P1615	Immobilizer control module/multifunction control module communication – incorrect code	Immobilizer control module, multifunction control module
P1616	Immobilizer control module/instrumentation control module communication – incorrect code	Immobilizer control module, instrumentation control module
P1618	Engine control module (ECM) – malfunction	ECM
P1620	Engine control module (ECM), supply voltage – out of limits	Wiring, engine control relay
P1622	Fuel pump relay	Wiring, fuel pump relay
P1625	Engine control module (ECM) – malfunction	ECM
P1627	Engine control module (ECM) – defective	ECM
P1635	Engine control module (ECM) – defective	ECM
P1640	Engine control module (ECM), MIL/RPM/fuel consumption signal(s) – circuit malfunction	Wiring, ECM
P1690	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, MIL
P1700	Transmission control module (TCM) – service request signal	ECM, TCM
P1705	Park/neutral position (PNP) switch – incorrect signal	Wiring, PNP switch, TCM
P1740	AT torque control, signal – malfunction	Wiring, ECM, TCM
P1743	Torque converter clutch – vibration	Transmission
P1760	System voltage, ignition – out of limits	Wiring, battery, alternator
P1780	Throttle position (TP) sensor, traction control – circuit malfunction	Wiring, TP sensor, TCM
P1781	CAN data bus, ECM actual torque signal – malfunction detected	Wiring, ECM, TCM
P1790	CAN data bus, ECM/TCM communication – malfunction detected	Wiring, ECM, TCM

**VAUXHALL-OPEL**Model: Corsa-B/Combo • Tigra • Astra-F • Astra-G • Vectra-B  
Omega-B • Zafira**Engine management/transmission**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1792	CAN data bus, ECM/TCM communication – malfunction detected	Wiring, ECM, TCM
P1800	System voltage, ignition – out of limits	Wiring, battery, alternator
P1813	AT torque control, signal – malfunction	Wiring, ECM, TCM
P1835	Transmission kick-down switch – circuit malfunction	Wiring, transmission kick-down switch, TCM
P1842	Throttle position (TP) sensor – signal out of range	Wiring, TP sensor, ECM, TCM
P1843	Engine coolant temperature (ECT) sensor – signal out of range	Wiring, ECT switch, ECM, TCM
P1844	Engine control module (ECM), torque control – signal out of range	Wiring, ECM, TCM
P1845	Transmission ratio monitor – circuit malfunction	Wiring, TCM
P1847	Transmission control module (TCM), multiplexing – no signal	Wiring, TCM
P1850	Shift solenoid (SS) 'C', band apply – circuit malfunction	Wiring, SS
P1860	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid
P1870	Torque converter clutch (TCC) – inoperative	TCC mechanical failure
P1890	Throttle position (TP) sensor – circuit malfunction	Wiring, TP sensor, TCM
P1895	Engine control module (ECM), actual torque signal – circuit malfunction	Wiring, ECM, TCM
U2101	CAN data bus – program malfunction	Wiring, ECM programming
U2103	Engine control module (ECM), CAN data bus – malfunction detected	Wiring
U2104	Engine control module (ECM), CAN data bus – malfunction detected	Wiring
U2105	Engine control module (ECM)/CAN data bus communication – malfunction	Wiring, ECM
U2106	Engine control module (ECM)/transmission control module (TCM) communication, CAN data bus – malfunction	Wiring
U2107	Engine control module (ECM)/multifunction control module communication, CAN data bus – malfunction	Wiring
U2108	Engine control module (ECM)/ABS control module/traction control module communication, CAN data bus	Wiring





Model: Corsa-C 1,7TD • Combo-C 1,7DI/DTI  
Astra-G 1,7TD • Zafira 1,7TD • Frontera-A 2,5TD

Year: 1995-04

Engine code: Y17DT, Y17DTL, Y17DTI, VM 41B

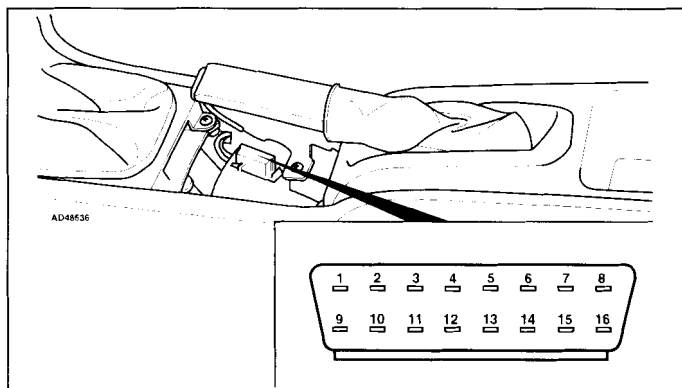
System: Bosch EDC/Denso HDRC

**OPEL-VAUXHALL**

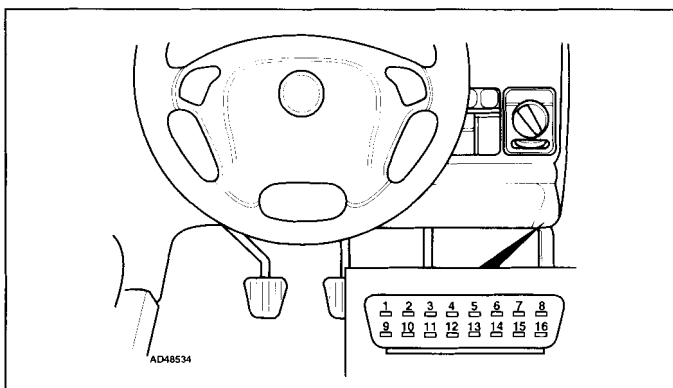


Engine management

## Data link connector (DLC) locations



Corsa-C/Combo-C/Astra-G/Zafira



Frontera-A

## Trouble codes

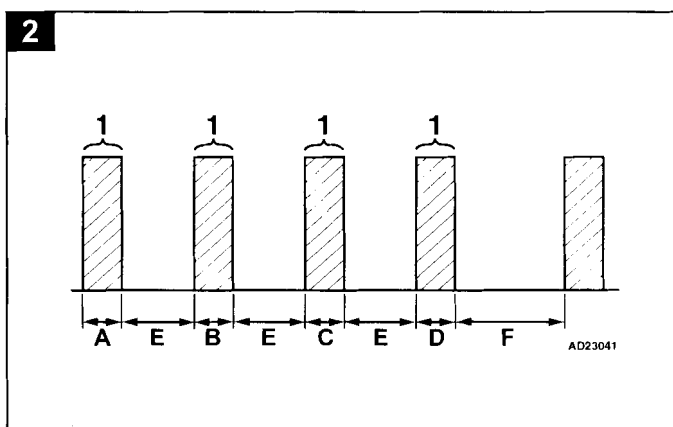
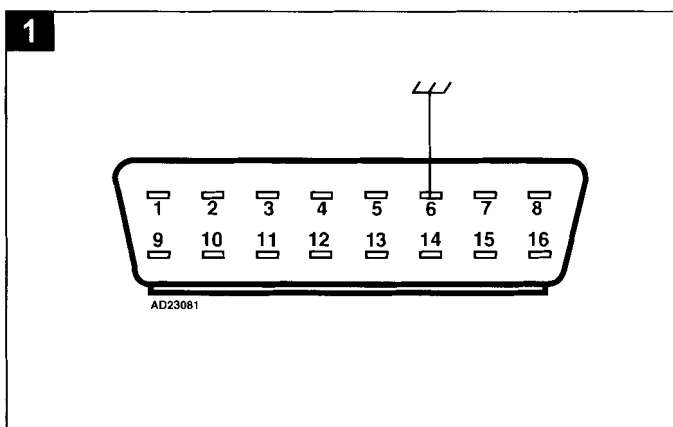
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

### Accessing

**NOTE:** Models without a terminal in position 6 of the 16-pin DLC do not display trouble codes using the MIL. Diagnostic equipment required.

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 6 and earth **1**.
- Switch ignition ON.
- Trouble codes will be displayed in groups of flashes.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of four groups of one or more flashes.
- The first group of flashes indicate the 'thousands' of the trouble code **2** [A].
- The second group of flashes indicate the 'hundreds' of the trouble code **2** [B].
- The third group of flashes indicate the 'tens' of the trouble code **2** [C].
- The fourth group of flashes indicate the 'units' of the trouble code **2** [D].
- Ten flashes in a group indicate '0'.
- A short pause separates each trouble code group **2** [E].
- A long pause separates each trouble code **2** [F].
- For example: Trouble code P1111 displayed **2**.



**Engine management****Erasing**

- The engine control module (ECM) fault memory can only be erased using diagnostic equipment connected to the data link connector (DLC).
- Repeat checking procedure to ensure no data remains in ECM fault memory.

**Trouble code identification**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P0	Refer to EOBD trouble code table	–
P1105	Barometric pressure (BARO) sensor – circuit malfunction	Wiring, BARO sensor
P1120	Accelerator pedal position (APP) sensor A – circuit malfunction	Wiring, APP sensor
P1122	Accelerator pedal position (APP) sensor B – circuit malfunction	Wiring, APP sensor
P1125	Turbocharger (TC) wastegate regulating valve – circuit malfunction	Wiring, TC wastegate regulating valve
P1173	Engine overheat protection activated – engine temperature above limit	Engine coolant/oil/fuel temperature
P1180	Fuel temperature sensor, in injection pump – malfunction	Wiring, fuel temperature sensor
P1195	Engine oil pressure switch – malfunction	Wiring, engine oil pressure switch
P1201	Injector needle lift sensor – circuit malfunction	Wiring, injector needle lift sensor
P1220	Fuel quantity adjustment control – malfunction	Fuel quantity adjuster, ECM
P1225	Fuel quantity adjuster – circuit malfunction	Wiring, fuel quantity adjuster
P1230	Injection timing control – malfunction	Excessive fuel pressure
P1530	AC cut-off relay – circuit malfunction	Wiring, AC cut-off relay, ECM
P1560	Engine control module (ECM), supply voltage – out of limits	Wiring, battery, alternator
P1571	Engine control module (ECM)/immobilizer control module – program error	ECM incorrectly programmed
P1572	Engine control module (ECM)/immobilizer control module – no immobilizer signal	Immobilizer control module programming
P1573	Engine control module (ECM)/immobilizer control module – incorrect immobilizer signal	Immobilizer control module programming
P1604	Engine control module (ECM) – malfunction	ECM incorrectly programmed, ECM defective
P1610	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1611	Immobilizer control module – incorrect security code entered	Immobilizer control module programming
P1612	Immobilizer control module – no/incorrect signal	Wiring, immobilizer control module
P1613	Immobilizer control module – no/incorrect signal	Wiring, immobilizer control module
P1614	Immobilizer control module – incorrect signal	Incorrect key
P1615	Immobilizer control module/multifunction control module communication – incorrect code	Immobilizer control module, multifunction control module
P1616	Immobilizer control module/instrumentation control module communication – incorrect code	Immobilizer control module, instrumentation control module
P1620	Engine control module (ECM) – defective	ECM

Model: Corsa-C 1,7TD • Combo-C 1,7DI/DTI • Astra-G 1,7TD  
Zafira 1,7TD • Frontera-A 2,5TD

**OPEL-VAUXHALL**



Engine management

EOBD type	Fault location	Probable cause
P1625	Engine control module (ECM), holding voltage – circuit malfunction	Wiring, engine control relay
P1630	Injection timing control – circuit malfunction	Wiring open circuit/short to positive
P1631	Fuel injection pump control module – defective	Wiring open circuit/short to positive
P1635	Glow plug control module, control signal – circuit malfunction	Wiring short to positive/earth, open circuit, glow plug control module
P1650	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, MIL
P1651	Fuel injection pump control module, CAN data bus – malfunction	Fuel injection pump control module
P1660	Fuel shut-off solenoid – circuit malfunction	Wiring open circuit/short to positive, fuel shut-off solenoid
P1694	Glow plug warning lamp – circuit malfunction	Wiring, glow plug warning lamp
P1725	Injector needle lift sensor – incorrect signal	Injector needle lift sensor
P1845	Engine coolant blower motor – circuit malfunction	Wiring, engine coolant blower motor, engine coolant blower motor relay
U2100	CAN data bus – circuit malfunction	Wiring
U2101	CAN data bus – program error	ECM programming
U2103	Engine control module (ECM), CAN data bus – malfunction detected	Wiring
U2104	Engine control module (ECM), CAN data bus – malfunction detected	Wiring
U2107	Engine control module (ECM)/multifunction control module communication, CAN data bus – malfunction	Wiring





# VAUXHALL-OPEL

Model: Astra/Kadett 2,0/16V • Astra-F 2,0/16V • Cavalier/Vectra 2,0 & 4x4  
Cavalier/Vectra/Calibra 2,0 16V/Turbo & 4x4/2,5 • Carlton/Omega-B 2,0/2,5/2,6/3,0 24V  
Senator-B 2,6/3,0/3,0 24V • Sintra 2,2 • Frontera-A 2,0/2,2/2,4

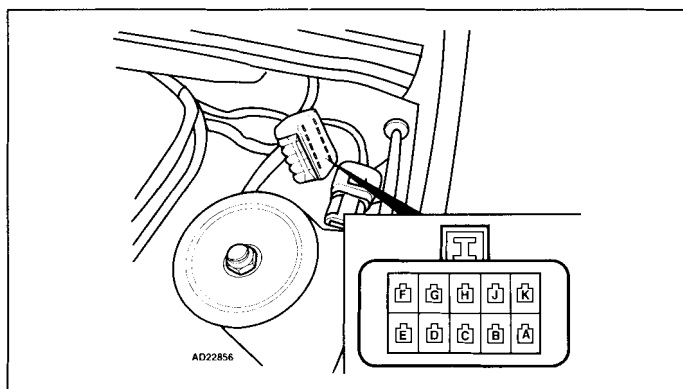
Year: 1986-00

Engine code: 20NE, 20SE, 20SER, 20SHE, 20XEJ, C20LET, C20NE, C20NEF, C20XE, C24NE, C25XE, C26NE, C30NE, C30SE, C30SEJ, X20SE, X22XE, X25XE, X30XE

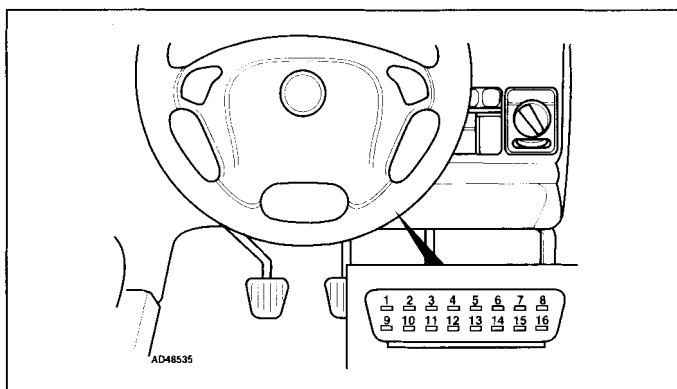
System: Bosch Motronic

## Engine management

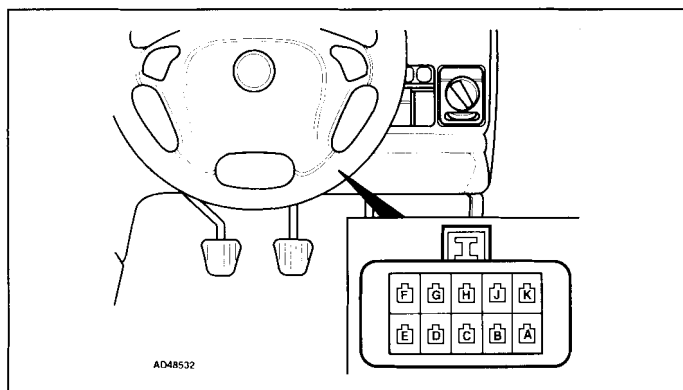
### Data link connector (DLC) locations



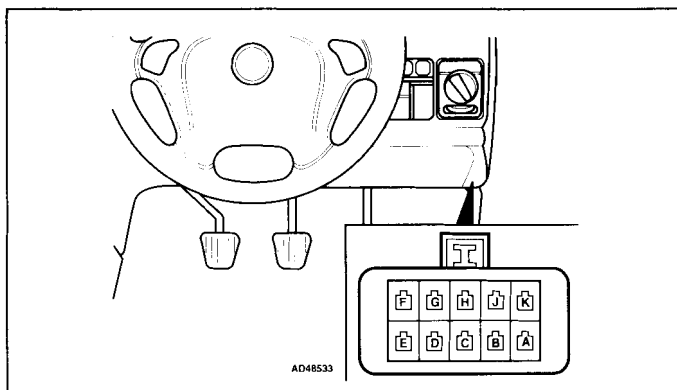
Cavalier/Vectra/Calibra



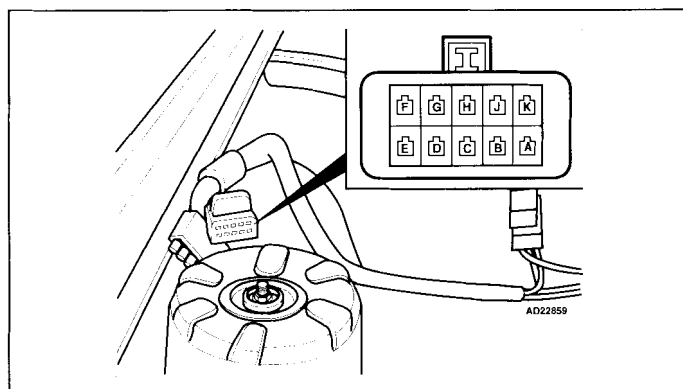
Omega-B



Astra-F



Frontera-A/Sintra



Astra/Kadett/Carlton/Senator-B



### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

#### Accessing

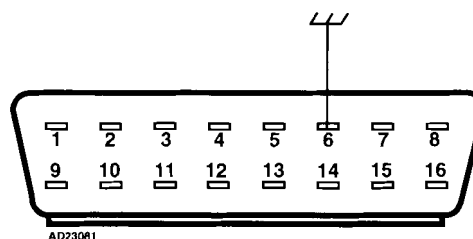
- Ensure ignition switched OFF.
- Except Omega-B: Bridge data link connector (DLC) terminals A and B **1** – 10-pin.
- Omega-B: Bridge data link connector (DLC) terminals 6 and earth **2** – 16-pin.

**NOTE:** Models without a terminal in position 6 of the 16-pin DLC do not display trouble codes using the MIL.

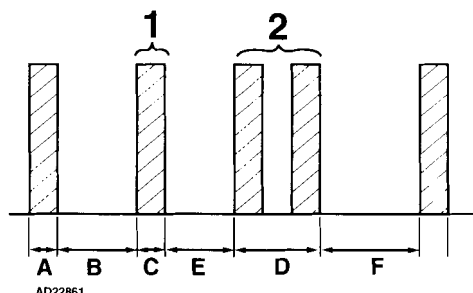
- Switch ignition ON.
- Trouble codes will be displayed after a short flash **3** [A] and a long pause **3** [B].
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of two groups of one or more flashes.
- The first group of flashes indicate the 'tens' of the trouble code **3** [C].
- The second group of flashes indicate the 'units' of the trouble code **3** [D].
- A short pause separates each trouble code group **3** [E].
- A long pause separates each trouble code **3** [F].
- For example: Trouble code 12 displayed **3**.
- Each trouble code including 12 displayed three times.

**NOTE:** Some models will display Trouble code 31 with the engine off. Trouble code erased when the engine is running.

2



3



#### Erasing

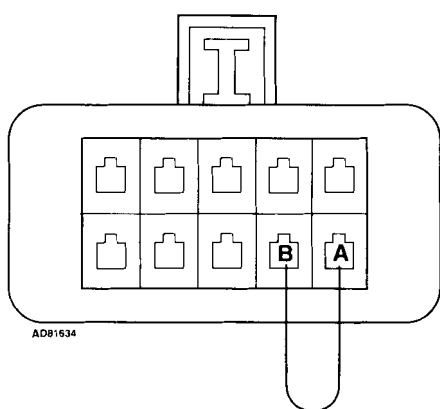
**NOTE:** Some models 1992 → may require diagnostic equipment to erase trouble codes.

- Switch ignition OFF.
- Disconnect battery earth lead for 60 seconds.

**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.

1



**Trouble code identification**

Flash type	Fault location	Probable cause
12	Start and end of diagnosis – some models	–
10	Engine control module (ECM) – coding	ECM incorrectly programmed
13	Heated oxygen sensor (HO2S)/oxygen sensor (O2S) – open circuit	Wiring, HO2S/O2S, ECM
14	Engine coolant temperature (ECT) sensor – voltage low	Wiring short to earth, ECT sensor, ECM
15	Engine coolant temperature (ECT) sensor – voltage high	Wiring short to positive, ECT sensor, ECM
16	Knock sensor (KS) 1 – signal	Wiring, KS
17	Knock sensor (KS) 2 – signal	Wiring, KS
18	Engine control module (ECM) – KS control	Internal KS control failure
19	Engine speed (RPM) sensor – incorrect signal	Wiring, RPM sensor, reluctor ring, ECM
21	Throttle position (TP) sensor – voltage high	Wiring short to positive, TP sensor, ECM
22	Throttle position (TP) sensor – voltage low	Wiring short to earth, TP sensor, ECM
23	Knock sensor (KS) – KS control	ECM
24	Vehicle speed sensor (VSS) – no signal	Wiring, VSS, ECM
25	Injector 1 – except Motronic M1.5 – voltage high	Wiring short to positive, injector, ECM
	Injectors – Motronic M1.5 – voltage high	Wiring short to positive, injectors, ECM
26	Injector 2 – voltage high	Wiring short to positive, injector, ECM
27	Injector 3 – voltage high	Wiring short to positive, injector, ECM
28	Injector 4 – voltage high	Wiring short to positive, injector, ECM
29	Injector 5 – voltage high	Wiring short to positive, injector, ECM
31	Engine speed (RPM) sensor – no signal	Wiring, RPM sensor, engine not running
32	Injector 6 – voltage high	Wiring short to positive, injector, ECM
33	Exhaust gas recirculation (EGR) solenoid – voltage low	Wiring open circuit/short to earth, EGR solenoid
34	Exhaust gas recirculation (EGR) solenoid – voltage high	Wiring short to positive, EGR solenoid
37	Engine control module (ECM) – MIL control	Wiring open circuit/short to earth, ECM
38	Heated oxygen sensor (HO2S)/oxygen sensor (O2S) – voltage low	Wiring short to earth, ECM
39	Heated oxygen sensor (HO2S)/oxygen sensor (O2S) – voltage high	Wiring short to positive, ECM
41	First gear position switch – voltage low	Wiring short to earth, first gear position switch
42	First gear position switch – voltage high	Wiring short to positive, first gear position switch
44	Heated oxygen sensor (HO2S)/oxygen sensor (O2S) – weak mixture	Wiring, ECT/IAT sensor, MAF/MAF sensor, CTP switch, fuel system, ECM
45	Heated oxygen sensor (HO2S)/oxygen sensor (O2S) – rich mixture	Wiring, ECT/IAT sensor, MAF/MAF sensor, CTP switch, fuel system, ECM
46	Secondary air injection (AIR) pump relay – voltage low	Wiring open circuit/short to earth, fuse, AIR pump relay, AIR solenoid, AIR pump
47	Secondary air injection (AIR) pump relay – voltage high	Wiring open circuit/short to positive, fuse, AIR pump relay, AIR solenoid, AIR pump

Model: Astra/Kadett 2,0/16V • Astra-F 2,0/16V • Cavalier/Vectra 2,0 & 4x4  
Cavalier/Vectra/Calibra 2,0 16V/Turbo & 4x4/2,5  
Carlton/Omega-B 2,0/2,5/2,6/3,0 24V • Senator-B 2,6/3,0/3,0 24V  
Sintra 2,2 • Frontera-A 2,0/2,2/2,4

**OPEL-VAUXHALL**



Engine management

Flash type	Fault location	Probable cause
48	Battery supply voltage – low	Wiring, battery, ECM relay, ECM
49	Battery supply voltage – high	Alternator, regulator
51	Engine control module (ECM) – incorrect programming	Wiring, ECM
52	Engine control module (ECM) – MIL control	Wiring short to positive, ECM
53	Fuel pump relay – voltage low	Wiring short to earth, fuel pump relay, fuel pump, ECM
54	Fuel pump relay – voltage high	Wiring short to positive, fuel pump relay, fuel pump, ECM
55	Engine control module (ECM) – defective	ECM
56	Idle air control (IAC) valve – voltage high	Wiring short to positive, IAC valve, ECM
57	Idle air control (IAC) valve – voltage low	Wiring short to earth, IAC valve, ECM
61	Evaporative emission (EVAP) canister purge valve – voltage low	Wiring short to earth, EVAP canister purge valve, ECM
62	Evaporative emission (EVAP) canister purge valve – voltage high	Wiring short to positive, EVAP canister purge valve, ECM
63	Intake manifold air control solenoid – voltage high	Wiring short to positive, intake manifold air control solenoid, ECM
65	Mixture adjustment resistor – voltage low	Wiring short to earth, ECM
66	Mixture adjustment resistor – voltage high	Wiring short to positive, ECM
67	Closed throttle position (CTP) switch – voltage low	Wiring, CTP switch, ECM
69	Intake air temperature (IAT) sensor – voltage low	Wiring short to earth, IAT sensor, ECM
71	Intake air temperature (IAT) sensor – voltage high	Wiring short to positive, IAT sensor, ECM
72	Wide open throttle (WOT) switch – voltage low	Wiring short to earth, WOT switch, ECM
73	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – voltage low	Wiring short to earth, MAF/VAF sensor, ECM
74	Mass air flow (MAF) sensor/volume air flow (VAF) sensor – voltage high	Wiring short to positive, MAF/VAF sensor, ECM
75	AT torque control, signal – voltage low	Wiring open circuit
76	AT torque control, signal – continuous	Wiring, ECM, TCM
79	Traction control – signal voltage low	Wiring, traction control module
81	Injector 1 – except Motronic M1.5 – voltage low	Wiring short to earth, injector, ECM
	Injectors – Motronic M1.5 – voltage low	Wiring short to earth, injectors, ECM
82	Injector 2 – voltage low	Wiring short to earth, injector, ECM
83	Injector 3 – voltage low	Wiring short to earth, injector, ECM
84	Injector 4 – voltage low	Wiring short to earth, injector, ECM
85	Injector 5 – voltage low	Wiring short to earth, injector, ECM
86	Injector 6 – voltage low	Wiring short to earth, injector, ECM
87	AC control signal – voltage low	Wiring short to earth, AC cut-off relay, ECM
88	AC control signal – voltage high	Wiring short to positive, AC cut-off relay, ECM
91	Oxygen sensor heater – voltage high	Wiring short to positive, ECM
93	Camshaft position (CMP) sensor – voltage low	Wiring short to earth, CMP sensor
94	Camshaft position (CMP) sensor – voltage high	Wiring short to positive, CMP sensor

**Engine management**

Flash type	Fault location	Probable cause
95	Fuel pressure regulator control solenoid – voltage low	Wiring short to earth, fuel pressure regulator control solenoid
96	Fuel pressure regulator control solenoid – voltage high	Wiring short to positive, fuel pressure regulator control solenoid
97	Traction control – signal voltage high	Wiring, traction control module
98	Oxygen sensor heater – voltage low	Wiring short to earth, ECM
113	Turbocharger (TC) pressure – out of limits	Wiring, TC, TC wastegate regulating valve, ECM
114	Turbocharger (TC) pressure – idling control limit exceeded	Wiring, TC wastegate regulating valve, ECM
115	Turbocharger (TC) pressure – full load control limit not reached	Turbocharger, ECM
116	Turbocharger (TC) pressure – full load control limit exceeded	Wiring, TC wastegate regulating valve, ECM
117	Turbocharger (TC) wastegate regulating valve – voltage low	Wiring short to earth, TC wastegate regulating valve, ECM
118	Turbocharger (TC) wastegate regulating valve – voltage high	Wiring short to positive, TC wastegate regulating valve, ECM
119	Manifold absolute pressure (MAP) sensor – range/performance problem	Wiring, MAP sensor, air leak, hose blocked
125	Manifold absolute pressure (MAP) sensor, signal – below lower limit	Wiring, MAP sensor, intake system
126	Manifold absolute pressure (MAP) sensor, signal – above upper limit	Wiring, MAP sensor, intake system
129	Exhaust gas recirculation (EGR) valve position sensor – voltage low	Wiring open circuit/short to earth, EGR valve position sensor
131	Exhaust gas recirculation (EGR) valve position sensor – voltage high	Wiring short to positive, EGR valve position sensor
132	Exhaust gas recirculation (EGR) valve position sensor – incorrect signal	Wiring, EGR valve position sensor
135	Engine control module (ECM) – MIL control	Wiring open circuit/short to earth, ECM
136	Engine control module (ECM) – unknown output error	ECM internal short to positive
137	Engine control module (ECM) – temperature high	–
138	Manifold absolute pressure (MAP) sensor – voltage low	Wiring short to earth, MAP sensor
139	Manifold absolute pressure (MAP) sensor – voltage high	Wiring short to positive, MAP sensor
143	Immobilizer control module – programming	Immobilizer control module incorrectly/not programmed
144	Immobilizer control module – no signal	Immobilizer control module
145	Immobilizer control module – incorrect signal	Immobilizer control module





Model: Astra-F 1,8/2,0 16V • Vectra/Cavalier 2,0 16V  
 Omega-B 2,0 16V • Calibra 2,0 16V

Year: 1993-98

Engine code: C18XE, C18XEL, X20XEV

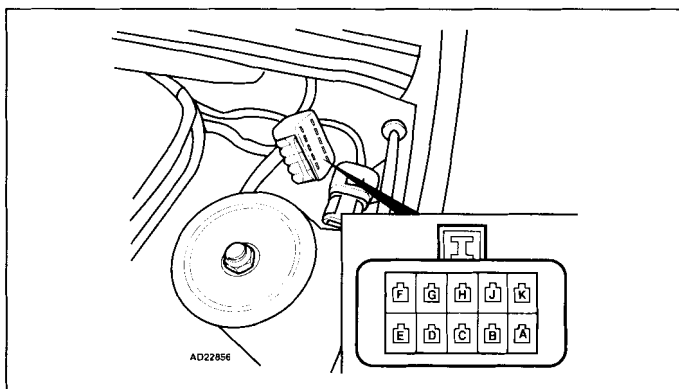
System: Simtec 56.0/56.1/56.5

**OPEL-VAUXHALL**

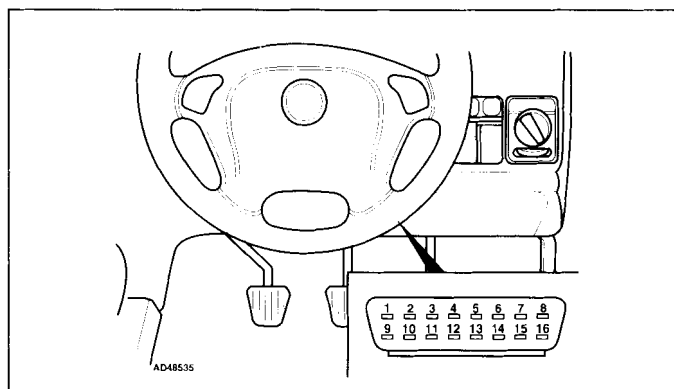


Engine management

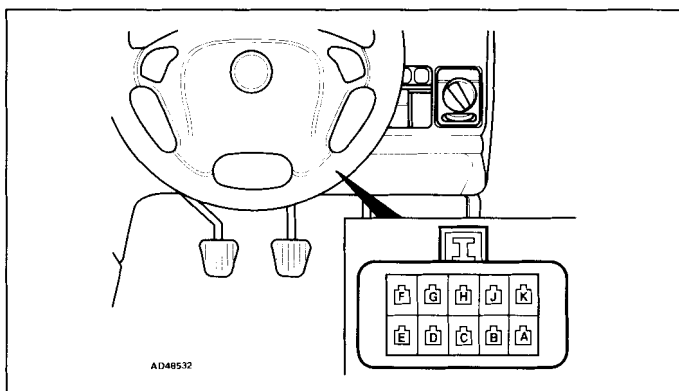
## Data link connector (DLC) locations



Vectra/Cavalier/Calibra



Omega-B



Astra-F

## Trouble codes

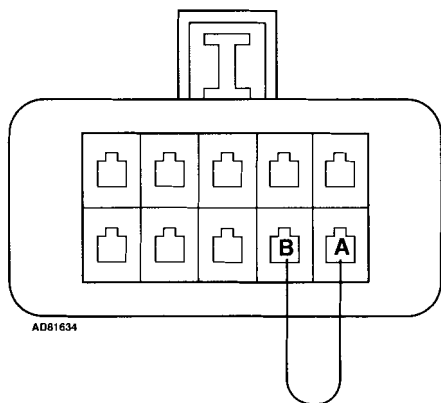
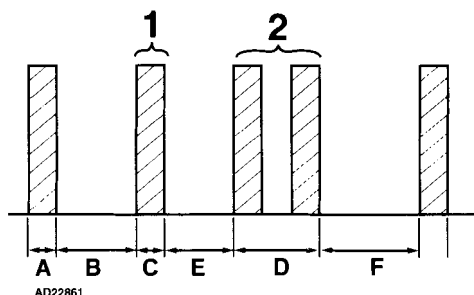
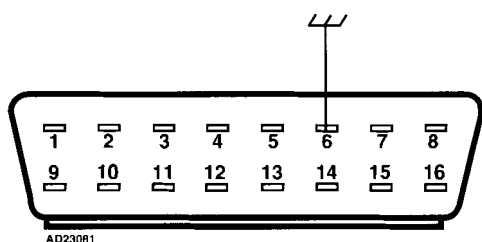
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals A and B  
**1** – 10-pin.
- Bridge data link connector (DLC) terminals 6 and earth  
**2** – 16-pin.
- Switch ignition ON.
- Trouble codes will be displayed after a short flash **3** [A] and a long pause **3** [B].

- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of two groups of one or more flashes.
- The first group of flashes indicate the 'tens' of the trouble code **3** [C].
- The second group of flashes indicate the 'units' of the trouble code **3** [D].
- A short pause separates each trouble code group **3** [E].
- A long pause separates each trouble code **3** [F].
- For example: Trouble code 12 displayed **3**.
- Each trouble code including 12 displayed three times.

**Engine management****1****3****2****Erasing**

**NOTE:** Some models 1992 → may require diagnostic equipment to erase trouble codes.

- Switch ignition OFF.
- Disconnect battery earth lead for 60 seconds.

**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.

**Trouble code identification**

Flash type	Fault location	Probable cause
12	Start and end of diagnosis	–
13	Heated oxygen sensor (HO2S)/oxygen sensor (O2S) – open circuit	Wiring, HO2S/O2S, ECM
14	Engine coolant temperature (ECT) sensor – voltage low	Wiring short to earth, ECT sensor, ECM
15	Engine coolant temperature (ECT) sensor – voltage high	Wiring short to positive, ECT sensor, ECM
16	Knock sensor (KS) 1 – signal	Wiring, KS
19	Engine speed (RPM) sensor – incorrect signal	Wiring, RPM sensor, reluctor ring, ECM
21	Throttle position (TP) sensor – voltage high	Wiring short to positive, TP sensor, ECM
22	Throttle position (TP) sensor – voltage low	Wiring short to earth, TP sensor, ECM
23	Knock sensor (KS) – KS control	ECM
24	Vehicle speed sensor (VSS) – no signal	Wiring, VSS, ECM
25	Injector 1 – voltage high	Wiring short to positive, injector, ECM
26	Injector 2 – voltage high	Wiring short to positive, injector, ECM
27	Injector 3 – voltage high	Wiring short to positive, injector, ECM
28	Injector 4 – voltage high	Wiring short to positive, injector, ECM
33	Exhaust gas recirculation (EGR) solenoid – voltage low	Wiring open circuit/short to earth, EGR solenoid
34	Exhaust gas recirculation (EGR) solenoid – voltage high	Wiring short to positive, EGR solenoid
37	Engine control module (ECM) – MIL control	Wiring open circuit/short to earth, ECM



Flash type	Fault location	Probable cause
38	Heated oxygen sensor (HO2S)/oxygen sensor (O2S) – voltage low	Wiring short to earth, ECM
39	Heated oxygen sensor (HO2S)/oxygen sensor (O2S) – voltage high	Wiring short to positive, ECM
44	Heated oxygen sensor (HO2S)/oxygen sensor (O2S) – weak mixture	Wiring, ECT/IAT sensor, MAF/MAF sensor, CTP switch, fuel system, ECM
45	Heated oxygen sensor (HO2S)/oxygen sensor (O2S) – rich mixture	Wiring, ECT/IAT sensor, MAF/MAF sensor, CTP switch, fuel system, ECM
46	Secondary air injection (AIR) pump relay – voltage low	Wiring open circuit/short to earth, fuse, AIR pump relay, AIR solenoid, AIR pump
47	Secondary air injection (AIR) pump relay – voltage high	Wiring open circuit/short to positive, fuse, AIR pump relay, AIR solenoid, AIR pump
48	Battery supply voltage – low	Wiring, battery, ECM relay, ECM
49	Battery supply voltage – high	Alternator, regulator
52	Engine control module (ECM) – MIL control	Wiring short to positive, ECM
53	Fuel pump relay – voltage low	Wiring short to earth, fuel pump relay, fuel pump, ECM
54	Fuel pump relay – voltage high	Wiring short to positive, fuel pump relay, fuel pump, ECM
55	Engine control module (ECM) – defective	ECM
56	Idle air control (IAC) valve – voltage low	Wiring short to earth, IAC valve, ECM
57	Idle air control (IAC) valve – voltage high	Wiring short to positive, IAC valve, ECM
59	Immobilizer control module – programming	Immobilizer control module incorrectly/not programmed
61	Evaporative emission (EVAP) canister purge valve – voltage low	Wiring short to earth, EVAP canister purge valve, ECM
62	Evaporative emission (EVAP) canister purge valve – voltage high	Wiring short to positive, EVAP canister purge valve, ECM
65	Module temperature switch, ECM – temperature high	Wiring, module temperature switch, ECM overheating
69	Intake air temperature (IAT) sensor – voltage low	Wiring short to earth, IAT sensor, ECM
71	Intake air temperature (IAT) sensor – voltage high	Wiring short to positive, IAT sensor, ECM
73	Mass air flow (MAF) sensor – voltage low	Wiring short to earth, MAF sensor, ECM
74	Mass air flow (MAF) sensor – voltage high	Wiring short to positive, MAF sensor, ECM
75	AT torque control, signal – voltage low	Wiring open circuit
76	AT torque control, signal – continuous	Wiring, ECM, TCM
81	Injector 1 – voltage low	Wiring short to earth, injector, ECM
82	Injector 2 – voltage low	Wiring short to earth, injector, ECM
83	Injector 3 – voltage low	Wiring short to earth, injector, ECM
84	Injector 4 – voltage low	Wiring short to earth, injector, ECM
87	AC control signal – voltage low	Wiring short to earth, AC cut-off relay, ECM
88	AC control signal – voltage high	Wiring short to positive, AC cut-off relay, ECM
91	Oxygen sensor heater – voltage high	Wiring short to positive, ECM
92	Camshaft position (CMP) sensor – incorrect signal	Wiring, CMP sensor
93	Immobilizer control module – no signal	Immobilizer control module
94	Immobilizer control module – incorrect signal	Immobilizer control module
98	Oxygen sensor heater – voltage low	Wiring short to earth, ECM





# VAUXHALL-OPEL

Model: Astra-G 1,7TD/2,0TD/2,2TD  
 Vectra-B 2,0TD/2,2TD • Omega-B 2,0TD/2,2TD  
 Zafira 2,0TD/2,2TD • Sintra 2,2TD  
 Frontera-B 2,2TD

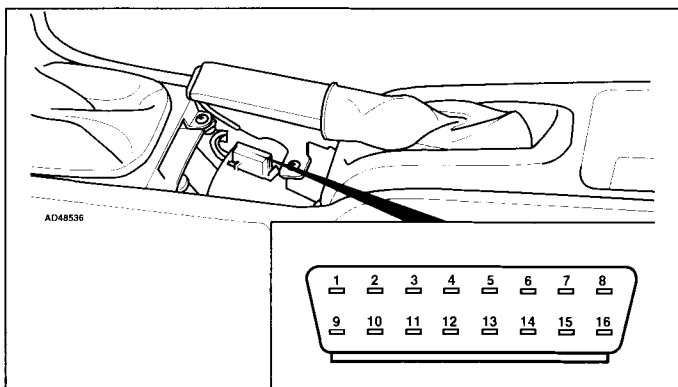
Year: 1997-04

Engine code: X17DTL, X20DTH, X20DTL, X22DTH, Y20DTH,  
 Y20DTL, Y22DTH, Y22DTR

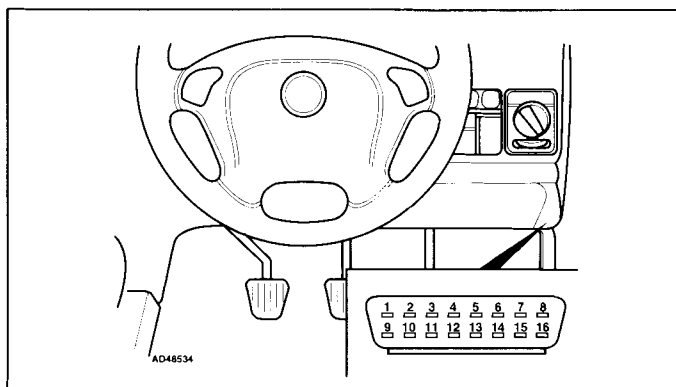
System: Bosch EDC 15M

## Engine management

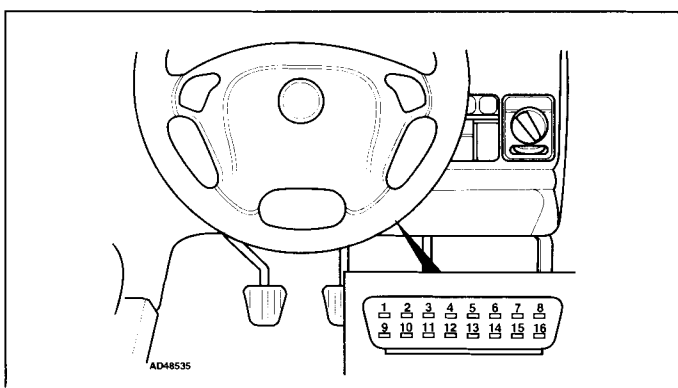
### Data link connector (DLC) locations



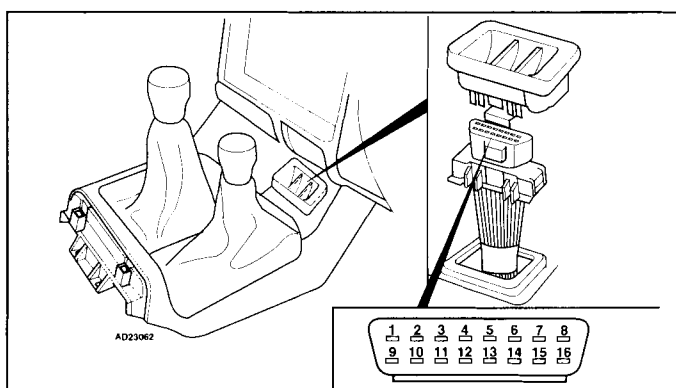
Astra-G/Vectra-B/Zafira



Sintra



Omega-B



Frontera-B

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

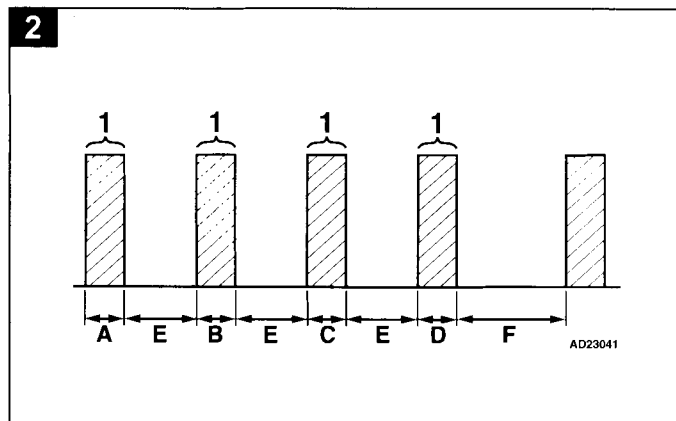
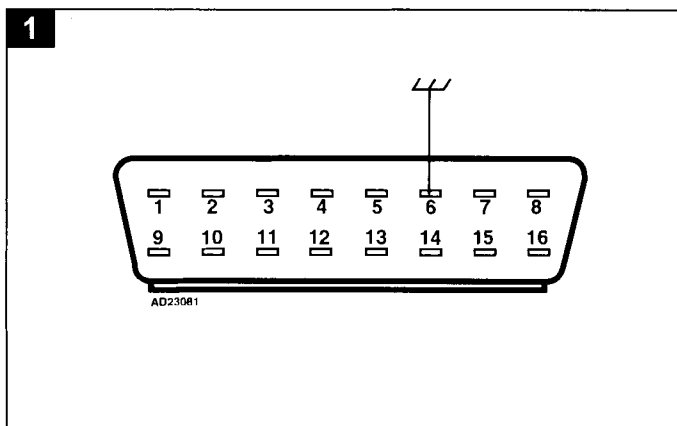
#### Accessing

**NOTE:** Models without a terminal in position 6 of the 16-pin DLC do not display trouble codes using the MIL. Diagnostic equipment required.

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 6 and earth **1**.
- Switch ignition ON.
- Trouble codes will be displayed in groups of flashes.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of four groups of one or more flashes.
- The first group of flashes indicate the 'thousands' of the trouble code **2** [A].
- The second group of flashes indicate the 'hundreds' of the trouble code **2** [B].
- The third group of flashes indicate the 'tens' of the trouble code **2** [C].
- The fourth group of flashes indicate the 'units' of the trouble code **2** [D].



- Ten flashes in a group indicate '0'.
- A short pause separates each trouble code group **2** [E].
- A long pause separates each trouble code **2** [F].
- For example: Trouble code P1111 displayed **2**.



### Erasing

- The engine control module (ECM) fault memory can only be erased using diagnostic equipment connected to the data link connector (DLC).
- Repeat checking procedure to ensure no data remains in ECM fault memory.

### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1100	Mass air flow (MAF) sensor/manifold absolute pressure (MAP) sensor – implausible signal	Intake system – air leak, blocked hose
P1105	Barometric pressure (BARO) sensor – circuit malfunction	Wiring, BARO sensor
P1110	Intake manifold air control solenoid – circuit malfunction	Wiring, intake manifold air control solenoid
P1125	Turbocharger (TC) wastegate regulating valve – circuit malfunction	Wiring, TC wastegate regulating valve
P1173	Engine overheat protection activated – engine temperature above limit	Engine coolant/oil/fuel temperature
P1180	Fuel temperature sensor, in injection pump – malfunction	Wiring, fuel temperature sensor
P1220	Fuel quantity adjustment control – malfunction	Fuel quantity adjuster, ECM
P1335	Fuel injection pump control module – CKP signal missing	Wiring, ECM, CKP sensor
P1345	Injection pump position sensor – malfunction	Wiring, injection pump position sensor
P1501	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1502	Immobilizer control module – no signal	Wiring, immobilizer control module
P1503	Immobilizer control module – incorrect signal	Immobilizer control module, incorrect key
P1515	Accelerator pedal position (APP) sensor/closed throttle position (CTP) switch – malfunction	Wiring, APP sensor, CTP switch
P1530	AC cut-off relay – circuit malfunction	Wiring, AC cut-off relay, ECM
P1560	Engine control module (ECM), supply voltage – out of limits	Wiring, battery, alternator
P1590	Ignition switch, supply voltage – out of limits	Wiring, battery, alternator
P1600	Engine control module (ECM) – defective	ECM



**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1601	Engine control module (ECM) – temperature limit exceeded	Ambient temperature too high, ECM malfunction
P1604	Engine control module (ECM) – malfunction	ECM incorrectly programmed, ECM defective
P1610	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1611	Immobilizer control module – incorrect security code entered	Immobilizer control module programming
P1612	Immobilizer control module – no/incorrect signal	Wiring, immobilizer control module
P1613	Immobilizer control module – no/incorrect signal	Wiring, immobilizer control module
P1614	Immobilizer control module – incorrect signal	Incorrect key
P1620	Engine control module (ECM) – defective	ECM
P1625	Engine control module (ECM), holding voltage – circuit malfunction	Wiring, engine control relay
P1630	Injection timing control – circuit malfunction	Wiring open circuit/short to positive
P1631	Fuel injection pump control module – defective	Wiring open circuit/short to positive
P1635	Glow plug control module, control signal – circuit malfunction	Wiring short to positive/earth, open circuit, glow plug control module
P1650	Fuel injection pump control module, CAN data bus – malfunction	Fuel injection pump control module
P1651	Fuel injection pump control module, CAN data bus – malfunction	Fuel injection pump control module
P1660	Fuel shut-off solenoid – circuit malfunction	Wiring open circuit/short to positive, fuel shut-off solenoid
P1690	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, MIL
P1694	Glow plug warning lamp – circuit malfunction	Wiring, glow plug warning lamp



Model: Astra-G 1,7 TD • Frontera-B 2,2 TD  
 Omega-B 2,5 TD • Vectra-C 2,0/2,2 TD

Year: 2001-04

Engine code: Y20DTH, Y22DTH, Y22DTR, Y25DT, Z17DTL

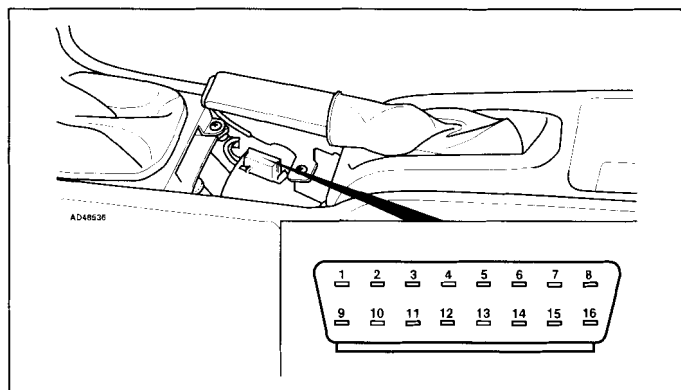
System: Bosch EDC 15/15M/15 C4 • Bosch PSG 16

**OPEL-VAUXHALL**

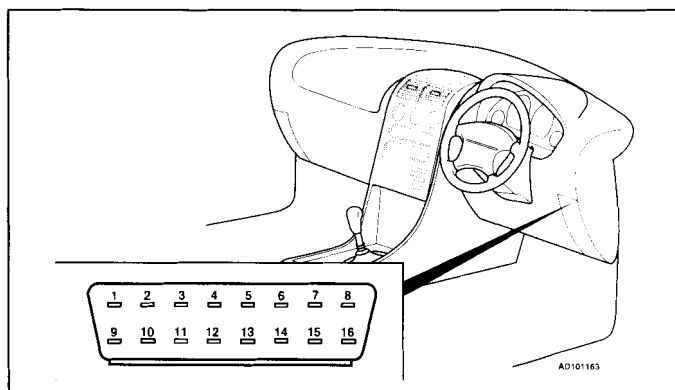


Engine management

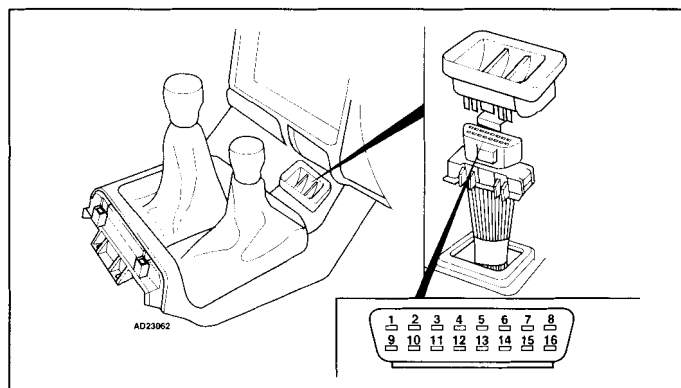
## Data link connector (DLC) locations



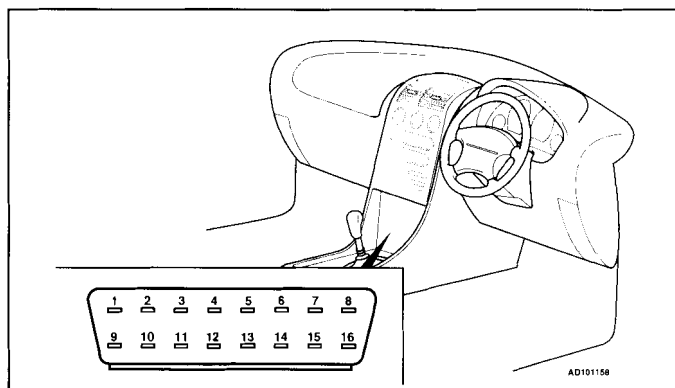
Astra-G



Omega-B



Frontera-B



Vectra-C

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P0	Refer to EOBD trouble code table	–
P1100	Mass air flow (MAF) sensor/manifold absolute pressure (MAP) sensor – implausible signal	Intake system – air leak, blocked hose
P1105	Barometric pressure (BARO) sensor – circuit malfunction	Wiring, BARO sensor
P1110	Intake manifold air control solenoid – circuit malfunction	Wiring, intake manifold air control solenoid
P1120	Accelerator pedal position (APP) sensor A – circuit malfunction	Wiring, APP sensor
P1122	Accelerator pedal position (APP) sensor B – circuit malfunction	Wiring, APP sensor
P1125	Turbocharger (TC) wastegate regulating valve – circuit malfunction	Wiring, TC wastegate regulating valve
P1173	Engine overheat protection activated – engine temperature above limit	Engine coolant/oil/fuel temperature
P1180	Fuel temperature sensor, in injection pump – malfunction	Wiring, fuel temperature sensor
P1189	Fuel rail pressure low while starting – fuel pressure malfunction	Fuel leak, fuel injector(s)
P1190	Fuel rail pressure sensor – malfunction	Wiring, connectors, pressure sensor, ECM
P1200	Fuel injector circuit – signal malfunction	Wiring, injector(s), ECM
P1211	Injector capacitor voltage 1 – circuit malfunction	Wiring, connector(s), injector(s), ECM
P1212	Injector capacitor voltage 2 – circuit malfunction	Wiring, connector(s), injector(s), ECM
P1220	Fuel quantity adjustment control – malfunction	Fuel quantity adjuster, ECM
P1222	Injection pump – malfunction	Mechanical fault in high pressure side of injection pump
P1255	Low pressure fuel sensor – malfunction	Wiring, connector, fuel supply, low pressure fuel sensor, ECM
P1260	Pre-supply pressure under limit for starting – malfunction	Wiring, connector, fuel supply, ECM
P1335 <b>1</b>	Fuel injection pump control module – CKP signal missing	Wiring, ECM, CKP sensor
P1335 <b>2</b>	Camshaft position (CMP) sensor – CMP signal missing	Wiring, connector, CMP sensor, ECM
P1335 <b>2</b>	Crankshaft position (CKP) sensor – CKP signal missing	Wiring, connector, CKP sensor, ECM
P1345	Injection pump position sensor – malfunction	Wiring, injection pump position sensor
P1350	Engine control module, supply voltage – circuit malfunction	Wiring, connectors, battery
P1412	Swirl level control solenoid – circuit malfunction	Wiring, connectors, battery, ECM
P1475	Reverse light – circuit malfunction	Wiring, connector, reverse light relay, ECM
P1480	Engine control module (ECM) – temperature limit exceeded	Ambient temperature too high, wiring, connector, relay box temperature sensor
P1501	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1502	Immobilizer control module – no signal	Wiring, immobilizer control module
P1503	Immobilizer control module – incorrect signal	Immobilizer control module, incorrect key
P1515	Accelerator pedal position (APP) sensor/closed throttle position (CTP) switch – malfunction	Wiring, APP sensor, CTP switch
P1515	Accelerator pedal position (APP) switch/brake pedal position (BPP) switch – signal error	APP switch/BPP switch operated simultaneously





EOBD type	Fault location	Probable cause
P1530	AC cut-off relay – circuit malfunction	Wiring, AC cut-off relay, ECM
P1540	AC control signal – malfunction	Wiring, trouble code(s) in AC system control module
P1560	Engine control module (ECM), supply voltage – out of limits	Wiring, battery, alternator
P1590	Vacuum solenoid valve – circuit malfunction	Wiring, Vacuum solenoid valve, ECM
P1600	Engine control module (ECM) – defective	ECM
P1601	Engine control module (ECM) – temperature limit exceeded	Ambient temperature too high, ECM malfunction
P1603	Engine control module (ECM) – malfunction	ECM incorrectly programmed, ECM defective
P1604	Engine control module (ECM) – malfunction	ECM incorrectly programmed, ECM defective
P1607	Fuel injector(s) – malfunction	Wiring, connector(s), injector(s), ECM
P1610	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1611	Immobilizer control module – incorrect security code entered	Immobilizer control module programming
P1612	Immobilizer control module – no/incorrect signal	Wiring, immobilizer control module
P1613	Immobilizer control module – no/incorrect signal	Wiring, immobilizer control module
P1614	Immobilizer control module – incorrect signal	Incorrect key
P1620 1 3	Engine control module (ECM) – defective	ECM
P1620 2 4	Accelerator pedal position (APP) sensor/Manifold absolute pressure (MAP) sensor/Mass air flow (MAF) sensor – circuit malfunction	Wiring, APP, MAP, MAF, ECM
P1622	Reference voltage – circuit malfunction	ECM
P1625	Engine control module (ECM), holding voltage – circuit malfunction	Wiring, engine control relay
P1630	Fuel injection quantity – circuit malfunction	ECM
P1631	Fuel injection pump control module – defective	Wiring open circuit/short to positive
P1632	Injection pump – malfunction	ECM
P1633	Injection pump – malfunction	ECM
P1634	Injection pump – malfunction	ECM
P1635 1	Glow plug control module, control signal – circuit malfunction	Wiring short to positive/earth, open circuit, glow plug control module
P1635 2	Manifold absolute pressure (MAP) sensor – circuit malfunction	Wiring, connector(s), MAP sensor, ECM
P1635 4	Injection pump – malfunction	ECM
P1650	Fuel injection pump control module, CAN data bus – malfunction	Fuel injection pump control module
P1650 3	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, MIL
P1651 3	Service vehicle soon request from transmission control module – circuit malfunction	Wiring, connector, TCM, instrument cluster, ECM
P1651	Injection pump, CAN data bus – malfunction	ECM



**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1655	Engine/Glow light – circuit malfunction	Wiring, connector, instrument cluster, ECM
P1656	Oil pressure light – circuit malfunction	Wiring, connector, instrument cluster, ECM
P1660	Fuel shut-off solenoid – circuit malfunction	Wiring open circuit/short to positive, fuel shut-off solenoid
P1690 <b>1 3</b>	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, MIL
P1690 <b>2</b>	Service vehicle soon indicator lamp – circuit malfunction	Wiring, service vehicle soon indicator lamp
P1694	Glow plug warning lamp – circuit malfunction	Wiring, glow plug warning lamp
P1811	Engine control module (ECM), CAN data bus – ABS signal malfunction	ABS control module
P1813	AT torque control, signal – malfunction	Wiring, ECM, TCM
P1835	Transmission kick-down switch – circuit malfunction	Wiring, transmission kick-down switch, TCM
P1896	Engine control module (ECM)/transmission control module (TCM) communication, CAN data bus – malfunction	Wiring, TCM, ECM
B3520	Engine mounting solenoid – signal malfunction	Wiring, connector, engine mounting solenoid, ECM
U2100	CAN data bus – circuit malfunction	Wiring
U2103	Engine control module (ECM)/ABS control module/traction control module communication, CAN data bus – malfunction	Wiring

**1** Frontera-B**2** Astra-G**3** Omega-B**4** Vectra-C

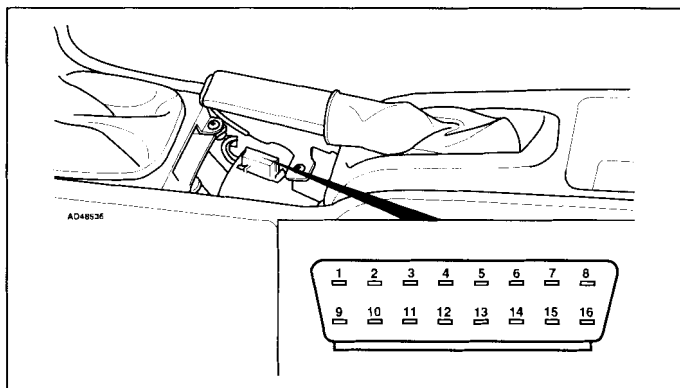
Model: Astra-G 2,2 • Speedster/VX220 2,2  
Vectra-C 2,0/2,2  
Year: 2000-04  
Engine code: Z20NET, Z22SE  
System: Trionic 8 • GMPT-E15/E16

**OPEL-VAUXHALL**

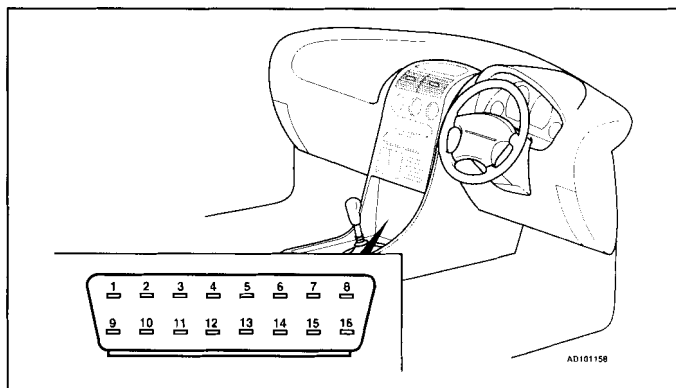


Engine management

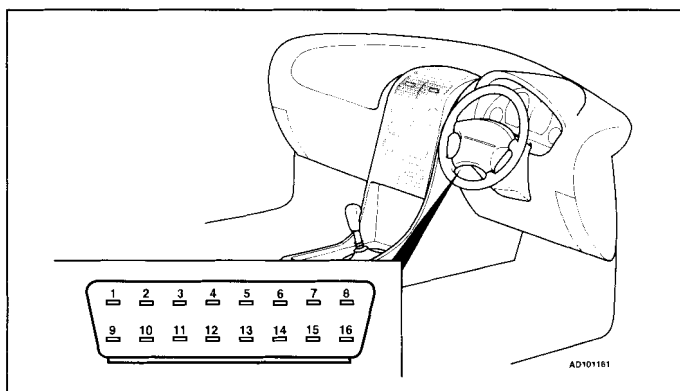
## Data link connector (DLC) locations



**Astra-G**



**Vectra-C**



**Speedster/VX220**

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P0	Refer to EOBD trouble code table	–
P1120	Throttle position sensor – circuit malfunction	Wiring, throttle valve positioner, ECM
P1125	Accelerator pedal position (APP) sensor – circuit malfunction	Wiring, APP sensor, ECM
P1131	Heated oxygen sensor (HO2S) 1, bank 1 – malfunction	Wiring, HO2S, ECM
P1132	Heated oxygen sensor (HO2S) 1, bank 1 – malfunction	Wiring, HO2S, ECM
P1133	Heated oxygen sensor (HO2S) 1, bank 1 – insufficient switching	Wiring, oxygen sensor heater, exhaust system leaking, HO2S
P1137	Heated oxygen sensor (HO2S) 2, bank 1 – enrichment lean	Wiring, HO2S, ECM
P1138	Heated oxygen sensor (HO2S) 2 – voltage high	Wiring short circuit to positive, fuel pressure high, fuel contamination, injector(s) leaking, HO2S, ECM
P1171	Fuel system – lean during acceleration	Fuel filter, fuel pump relay, fuel pump, HO2S, injectors
P1220	Throttle position sensor 2 – circuit malfunction	Wiring open circuit/short circuit to ground/short circuit to positive, throttle valve positioner, ECM
P1221	Throttle position sensor 1/2 – signal variation	Wiring, throttle valve positioner, ECM
P1271	Accelerator pedal position (APP) sensor 1/2 – signal variation	Wiring, APP sensor, ECM
P1275	Accelerator pedal position (APP) sensor 1 – circuit malfunction	Wiring open circuit/short circuit to ground/short circuit to positive, APP sensor, ECM
P1276	Accelerator pedal position (APP) sensor 1/3 – signal variation	Wiring, APP sensor, ECM
P1280	Accelerator pedal position (APP) sensor 2 – circuit malfunction	Wiring open circuit/short circuit to ground/short circuit to positive, APP sensor, ECM
P1312	Random/multiple cylinder(s) – misfire detected	Mechanical fault, wiring, ignition/fuel system, mass air flow (MAF) sensor, fuel pump relay, manifold absolute pressure (MAP) sensor, intake leak
P1315	Ignition diagnostic module – malfunction	Wiring, ignition diagnostic module, ECM
P1336	Crankshaft position sensor (CKP) – variation not learned	Learning procedure not performed
P1340	Ignition diagnostic module – malfunction	Wiring, ignition diagnostic module, ECM
P1341	Cylinder 1 – misfire detected	Spark plug, wiring, ignition coil, ignition diagnostic module
P1342	Cylinder 2 – misfire detected	Spark plug, wiring, ignition coil, ignition diagnostic module
P1343	Cylinder 3 – misfire detected	Spark plug, wiring, ignition coil, ignition diagnostic module
P1344	Cylinder 4 – misfire detected	Spark plug, wiring, ignition coil, ignition diagnostic module
P1345	Crankshaft position sensor (CKP)/camshaft position (CMP) sensor – signal variation	CKP sensor, CMP sensor, camshaft alignment, mechanical fault
P1380	Rough road signal – signal error	ABS control module trouble code(s) stored
P1404	Exhaust gas recirculation (EGR) solenoid valve	Wiring open circuit/short circuit to ground, supply wire, EGR valve, ECM
P1512	Throttle position adaption – signal variation	Wiring, throttle valve positioner, ECM



EOBD type	Fault location	Probable cause
P1514	Electronic throttle control – malfunction	Wiring, MAP sensor, ECM
P1515	Throttle command/actual throttle position – signal variation	Wiring, throttle valve sticking, throttle valve positioner, ECM
P1516	Throttle actuator control position – signal variation	Wiring, throttle valve positioner, ECM
P1523	Throttle actuator control position – signal variation	Wiring, throttle valve positioner, ECM
P1571	Traction control system (TCS), torque request circuit	Wiring open circuit/short circuit to ground/short circuit to positive, ABS control module trouble code(s) stored, ECM
P1574	Brake light switch – malfunction	Wiring, brake light switch, ECM
P1599	Engine stall detected – malfunction	ECM
P1610	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1611	Immobilizer control module – coding	Immobilizer control module incorrect code entered
P1612	Immobilizer control module – incorrect/no signal	Immobilizer control module
P1613	Immobilizer control module – incorrect/no signal	Immobilizer control module
P1614	Immobilizer control module – incorrect signal	Incorrect key
P1621	Engine control module (ECM) – memory performance	ECM
P1633	Engine control module (ECM), ignition supply voltage	Fuse, wiring open circuit, ECM
P1635	Sensor supply voltage – circuit 1 malfunction	Wiring short circuit to ground/positive, ground wiring open circuit, APP sensor, ECM
P1639	Sensor supply voltage – circuit 1 malfunction	Wiring short circuit to ground/positive, ground wiring open circuit, APP sensor, ECM
P1680	Accelerator pedal position (APP) sensor – circuit malfunction	Wiring open circuit/short circuit to ground/short circuit to positive, APP sensor, ECM
P1681	Throttle position sensor monitor – malfunction	Wiring, throttle valve positioner, ECM
P1682 <sup>1</sup>	Electronic throttle control – malfunction	Wiring, throttle valve positioner, ECM
P1682 <sup>2</sup>	Main relay – contacts stuck open	Relay, wiring, ECM
P1700	Transmission control module (TCM), MIL request – malfunction	ECM, TCM
U2101	CAN data bus – program malfunction	ECM programming
U2103	Engine control module (ECM), CAN data bus – malfunction detected	Wiring
U2104	Engine control module (ECM), CAN data bus – malfunction detected	Wiring
U2106	Engine control module (ECM)/transmission control module (TCM) communication, CAN data bus – malfunction	Wiring
U2108	Engine control module (ECM)/ABS control module/traction control module communication, CAN data bus – malfunction	Wiring

<sup>1</sup> GMPT-E15/E16<sup>2</sup> Trionic 8

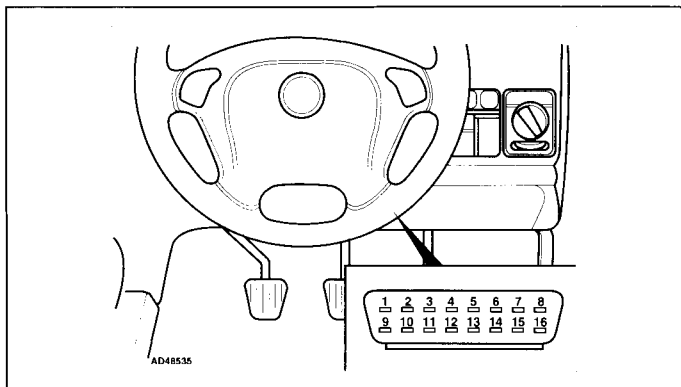


# VAUXHALL-OPEL

Model: Omega-B 2,5TD  
Year: 1994-00  
Engine code: 25DT, X25DT  
System: Bosch EDC/MSA 11

## Engine management

### Data link connector (DLC) locations



### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

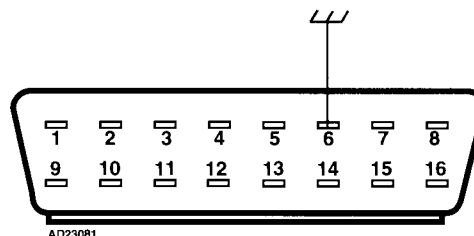
#### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals 6 and earth **1**.

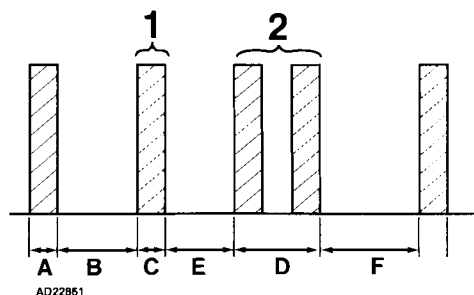
**NOTE:** Models without a terminal in position 6 of the 16-pin DLC do not display trouble codes using the MIL.

- Switch ignition ON.
- Trouble codes will be displayed after a short flash **2** [A] and a long pause **2** [B].
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of two groups of one or more flashes.
- The first group of flashes indicate the 'tens' of the trouble code **2** [C].
- The second group of flashes indicate the 'units' of the trouble code **2** [D].
- A short pause separates each trouble code group **2** [E].
- A long pause separates each trouble code **2** [F].
- For example: Trouble code 12 displayed **2**.
- Each trouble code including 12 displayed three times.

1



2



#### Erasing

- The engine control module (ECM) fault memory can only be erased using diagnostic equipment connected to the data link connector (DLC).
- Repeat checking procedure to ensure no data remains in ECM fault memory.

**Trouble code identification**

Flash/scanner type	Fault location	Probable cause
12	Start and end of diagnosis – some models	–
14	Engine coolant temperature (ECT) sensor – voltage low	Wiring short to earth, ECT sensor, ECM
15	Engine coolant temperature (ECT) sensor – voltage high	Wiring open circuit/short to positive, ECT sensor, ECM
16	Fuel temperature sensor – voltage low	Wiring short to earth, ECT sensor, ECM
17	Fuel temperature sensor – voltage high	Wiring open circuit/short to positive, ECT sensor, ECM
19	Engine speed (RPM) sensor – incorrect signal	Wiring, RPM sensor, reluctor ring, ECM
21	Accelerator pedal position (APP) sensor – voltage high	Wiring open circuit/short to positive, APP sensor, ECM
23	Accelerator pedal position (APP) sensor – incorrect idle speed signal	Wiring, APP sensor, ECM
24	Vehicle speed sensor (VSS) – no signal	Wiring, VSS, ECM
31	Engine speed (RPM) sensor – no signal	Wiring, RPM sensor
34	Injection timing control – out of range	Wiring, fuel injection pump, ECM
37	Brake pedal position (BPP) switch – incorrect signal	Wiring, BPP switch
39	Immobilizer – activated	Wiring, incorrect key, ECM
41	Manifold absolute pressure (MAP) sensor, TC boost pressure – voltage low	Wiring short to earth, MAP sensor
42	Manifold absolute pressure (MAP) sensor, TC boost pressure – voltage high	Wiring open circuit/short to positive, MAP sensor
43	Manifold absolute pressure (MAP) sensor, TC boost pressure – invalid signal	Wiring, MAP sensor, TC
44	Manifold absolute pressure (MAP) sensor, TC boost pressure – incorrect signal	Wiring, MAP sensor, TC
48	Battery supply voltage – low	Wiring, battery, ECM relay, ECM
49	Glow plug control – circuit malfunction	Wiring, glow plugs, glow plug control module
54	Fuel shut-off solenoid – circuit malfunction	Wiring short to earth, fuel shut-off solenoid
55	Engine control module (ECM) – defective	ECM
61	Fuel quantity adjuster position sensor – incorrect signal	Wiring, fuel quantity adjuster position sensor
64	Fuel quantity adjustment control – malfunction	Wiring, fuel quantity adjuster/position sensor, ECM
65	Engine control module (ECM) – overheating	Wiring, module temperature switch, ambient temperature
73	Intake air temperature (IAT) sensor – voltage low	Wiring short to earth, IAT sensor, ECM
74	Intake air temperature (IAT) sensor – voltage high	Wiring open circuit/short to positive, IAT sensor, ECM
81	Injector needle lift sensor – circuit malfunction	Wiring, injector needle lift sensor
82	Injector needle lift sensor – incorrect signal	Injector needle lift sensor, ECM
83	Immobilizer control module – programming	Immobilizer control module incorrectly/not programmed
84	Immobilizer control module – no signal	Immobilizer control module



**Engine management**

Flash/scanner type	Fault location	Probable cause
85	Immobilizer control module – incorrect signal	Immobilizer control module
87	Mass air flow (MAF) sensor – voltage high	Wiring open circuit/short to positive, MAF sensor, ECM
88	Mass air flow (MAF) sensor – voltage low	Wiring short to earth, MAF sensor, ECM
89	Mass air flow (MAF) sensor – signal out of range	Wiring, MAF sensor, MAP sensor, ECM
91	Cruise control – signal low	Wiring short to earth
92	Cruise control – signal high	Wiring open circuit/short to positive
95	Engine control module (ECM) – malfunction	ECM
96	Exhaust gas recirculation (EGR) solenoid – voltage low	Wiring open circuit/short to earth, EGR solenoid
97	Fuel injection pump – adaptation failure	Incorrect adjustment





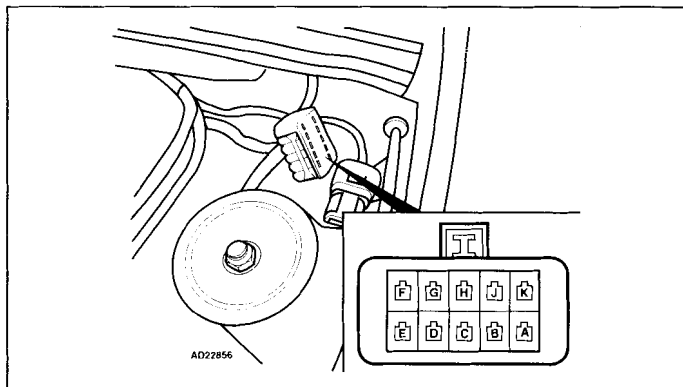
Model: Calibra 2,0  
 Year: 1996-98  
 Engine code: X20XEV  
 System: Simtec 56.5

**OPEL-VAUXHALL**



Engine management

## Data link connector (DLC) locations



## Trouble codes

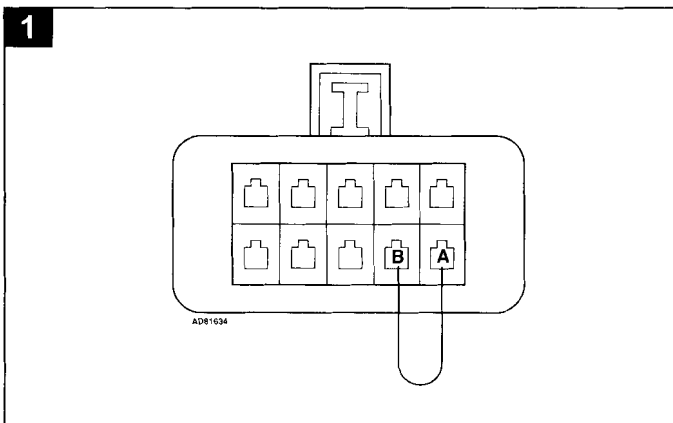
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the malfunction indicator lamp (MIL).
- The ECM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

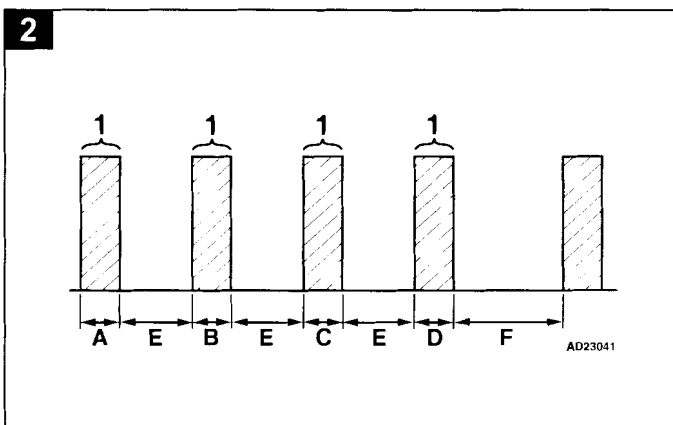
### Accessing

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals A and B **1**.
- Switch ignition ON.
- Trouble codes will be displayed in groups of flashes.
- Count MIL flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of four groups of one or more flashes.
- The first group of flashes indicate the 'thousands' of the trouble code **2** [A].
- The second group of flashes indicate the 'hundreds' of the trouble code **2** [B].
- The third group of flashes indicate the 'tens' of the trouble code **2** [C].
- The fourth group of flashes indicate the 'units' of the trouble code **2** [D].
- Ten flashes in a group indicate '0'.
- A short pause separates each trouble code group **2** [E].
- A long pause separates each trouble code **2** [F].
- For example: Trouble code P1111 displayed **2**.

**1**



**2**



### Erasing

- The engine control module (ECM) fault memory can only be erased using diagnostic equipment connected to the data link connector (DLC).
- Repeat checking procedure to ensure no data remains in ECM fault memory.



**Engine management****Trouble code identification**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P0	Refer to EOBD trouble code table	–
P1110	Intake manifold air control solenoid 1 – circuit malfunction	Wiring, intake manifold air control solenoid
P1229	Engine control relay – voltage high	Wiring, engine control relay
P1230	Engine control relay – voltage low	Wiring, engine control relay
P1326	Knock control, cylinder 1 – control limit reached	Wiring, knock sensor (KS), ECM
P1327	Knock control, cylinder 2 – control limit reached	Wiring, knock sensor (KS), ECM
P1328	Knock control, cylinder 3 – control limit reached	Wiring, knock sensor (KS), ECM
P1329	Knock control, cylinder 4 – control limit reached	Wiring, knock sensor (KS), ECM
P1501	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1502	Immobilizer control module – no signal	Wiring, immobilizer control module
P1503	Immobilizer control module – incorrect signal	Immobilizer control module, incorrect key
P1530	AC cut-off relay – circuit malfunction	Wiring, AC cut-off relay, ECM
P1600	Engine control module (ECM) – program error	ECM programming
P1601	Module temperature switch, ECM – temperature high	Wiring, module temperature switch, ECM overheating
P1690	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, MIL
P1740	AT torque control, signal – malfunction	Wiring, ECM, TCM



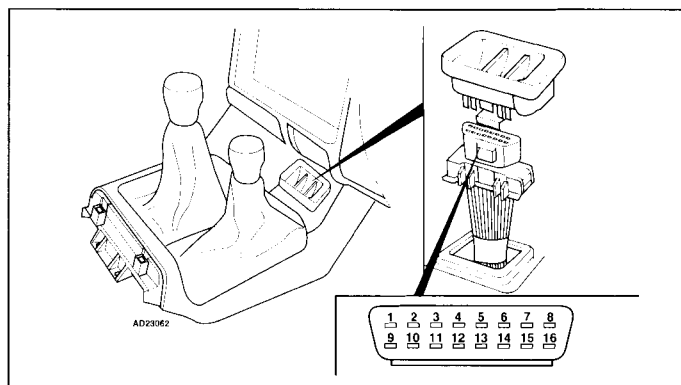
Model: Vectra-C 1,6 • Frontera-B 2,2  
 Year: 2000-04  
 Engine code: Y22SE, Z16XE  
 System: Multec S/S(F)

**OPEL-VAUXHALL**

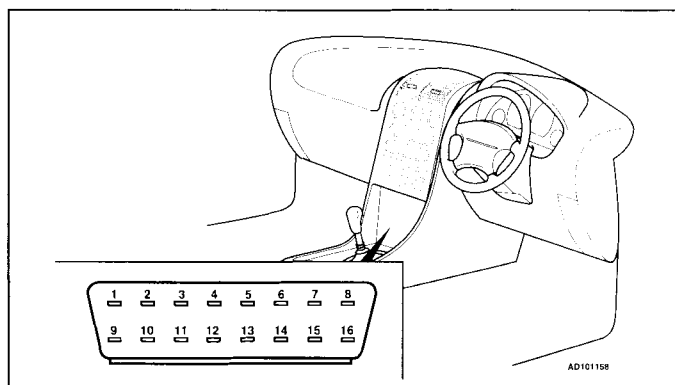


Engine management

## Data link connector (DLC) locations



Frontera-B



Vectra-C

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

EOBD type	Fault location	Probable cause
P0	Refer to EOBD trouble code table	–
P1106	Manifold absolute pressure (MAP) sensor – supply voltage high	Wiring, MAP sensor, ECM
P1107	Manifold absolute pressure (MAP) sensor – supply voltage low	Wiring, MAP sensor, ECM
P1110	Intake manifold air control solenoid 1 – circuit malfunction	Wiring, intake manifold air control solenoid
P1111	Intake air temperature (IAT) sensor – supply voltage high	Wiring, IAT sensor, ECM
P1112	Intake air temperature (IAT) sensor – supply voltage low	Wiring, IAT sensor, ECM
P1114	Engine coolant temperature (ECT) sensor – supply voltage low	Wiring, IAT sensor, ECM
P1115	Engine coolant temperature (ECT) sensor – supply voltage high	Wiring, IAT sensor, ECM
P1120 <b>1</b>	Throttle position (TP) sensor/manifold absolute pressure (MAP) sensor – implausible signal	Air leak, MAP sensor/hose
P1120 <b>2</b>	Accelerator pedal position (APP) sensor A – circuit malfunction	Wiring, APP sensor



**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1121	Throttle position (TP) sensor – supply voltage high	Wiring, TP sensor, ECM
P1122 <b>1</b>	Throttle position (TP) sensor – supply voltage low	Wiring, TP sensor, ECM
P1122 <b>2</b>	Accelerator pedal position (APP) sensor B – circuit malfunction	Wiring, APP sensor
P1130	Heated oxygen sensor (HO2S) 1, bank 1 – low signal variance	Wiring, HO2S sensor, ECM
P1133	Heated oxygen sensor (HO2S) 1, bank 1 – insufficient switching	Wiring, exhaust system leaking, HO2S
P1134	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Wiring, exhaust system leaking, HO2S
P1171	Mixture control (MC), engine under load – mixture lean	Fuel system, intake system
P1229	Engine control relay – voltage high	Wiring, engine control relay
P1230	Engine control relay – circuit malfunction	Wiring, engine control relay
P1231	Fuel pump relay	Wiring, fuel pump relay
P1300	Fuel tank empty	Wiring, fuel gauge tank sensor, fuel tank empty
P1326	Knock control, cylinder 1 – control limit reached	Wiring, knock sensor (KS), ECM
P1327	Knock control, cylinder 2 – control limit reached	Wiring, knock sensor (KS), ECM
P1328	Knock control, cylinder 3 – control limit reached	Wiring, knock sensor (KS), ECM
P1329	Knock control, cylinder 4 – control limit reached	Wiring, knock sensor (KS), ECM
P1336	Crankshaft position sensor (CKP) – variation not learned	Learning procedure not performed
P1380	Rough road signal – signal error	ABS control module trouble code(s) stored
P1381	Rough road signal – no communication from ABS CAN data bus	Wiring open circuit, ABS system
P1391	Deceleration sensor – supply voltage circuit	Wiring, connector, deceleration sensor, ECM
P1392	Deceleration sensor – supply voltage low	Wiring, connector, deceleration sensor, ECM
P1393	Deceleration sensor – supply voltage high	Wiring, connector, deceleration sensor, ECM
P1404	Exhaust gas recirculation (EGR) valve – range/performance problem	Wiring, EGR valve
P1405	Exhaust gas recirculation (EGR) valve position sensor – malfunction	Wiring, EGR valve position sensor
P1410	Secondary air injection (AIR) pump relay – circuit malfunction	Wiring, AIR pump relay
P1441	Evaporative emission (EVAP) system – leak detected	Hose connection(s), EVAP canister, EVAP canister purge valve
P1481	Engine coolant blower motor relay 1 – malfunction	Wiring, engine coolant blower motor relay
P1482	Engine coolant blower motor relay 2 – malfunction	Wiring, engine coolant blower motor relay
P1483	Engine coolant blower motor relay 3 – malfunction	Wiring, engine coolant blower motor relay
P1500	Electronic throttle system (ETS) – circuit malfunction	Wiring, ETS, ECM
P1501	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1502	Immobilizer control module – no signal	Wiring, immobilizer control module
P1503	Immobilizer control module – incorrect signal	Immobilizer control module, incorrect key
P1508	Idle air control (IAC) valve – circuit malfunction	Wiring open circuit/short to earth, IAC valve
P1509	Idle air control (IAC) valve – circuit malfunction	Wiring short to positive, IAC valve



<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1510	Closed throttle position (CTP) switch – circuit malfunction	Wiring, CTP switch
P1515	Idle air control (IAC) valve – circuit malfunction	Wiring, IAC valve
P1530	AC cut-off relay – circuit malfunction	Wiring, AC cut-off relay, ECM
P1540	AC refrigerant pressure sensor – circuit malfunction	Wiring, AC refrigerant pressure sensor, ECM
P1546	AC compressor clutch, signal – circuit malfunction	Wiring
P1550	Electronic throttle system (ETS) – in emergency mode	ETS, other trouble codes
P1560	System voltage, battery – out of limits	Wiring, battery, alternator
P1571	Brake pedal position (BPP) switch – circuit malfunction	Wiring, BPP switch
P1600	Engine control module (ECM) – program error	ECM programming
P1601	Module temperature switch, ECM – temperature high	Wiring, module temperature switch, ECM overheating
P1602	Knock control – RAM error	ECM
P1604	Engine control module (ECM) – defective	ECM
P1605	Engine control module (ECM) – coding	ECM programming
P1610	Immobilizer control module – program error	Immobilizer control module incorrectly programmed
P1611	Immobilizer control module – incorrect security code entered	Immobilizer control module programming
P1612	Immobilizer control module – no/incorrect signal	Wiring, immobilizer control module
P1613	Immobilizer control module – no/incorrect signal	Wiring, immobilizer control module
P1614	Immobilizer control module – incorrect signal	Incorrect key
P1615	Immobilizer control module/multifunction control module communication – incorrect code	Immobilizer control module, multifunction control module
P1616	Immobilizer control module/instrumentation control module communication – incorrect code	Immobilizer control module, instrumentation control module
P1618	Engine control module (ECM) – malfunction	ECM
P1620	Engine control module (ECM), supply voltage – out of limits	Wiring, engine control relay
P1622	Fuel pump relay	Wiring, fuel pump relay
P1625	Engine control module (ECM) – malfunction	ECM
P1626	Data bus, immobilizer	Wiring, body control module (BCM) trouble code(s) stored
P1627	Engine control module (ECM) – defective	ECM
P1631	Data bus, immobilizer – incorrect signal	Wiring, body control module (BCM) trouble code(s) stored
P1635	Engine control module (ECM) – defective	ECM
P1640	Engine control module (ECM), MIL/RPM/fuel consumption signal(s) – circuit malfunction	Wiring, ECM
P1648	Immobilizer control module – coding	Incorrect code entered, wiring, immobilizer control module, ECM
P1649	Immobilizer control module – coding	Incorrect code entered, wiring, immobilizer control module, ECM
P1690	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, MIL
P1700	Transmission control module (TCM) – service request signal	ECM, TCM

**Engine management**

<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1705	Park/neutral position (PNP) switch – incorrect signal	Wiring, PNP switch, TCM
P1740	AT torque control, signal – malfunction	Wiring, ECM, TCM
P1743	Torque converter clutch – vibration	Transmission
P1760	System voltage, ignition – out of limits	Wiring, battery, alternator
P1780	Throttle position (TP) sensor, traction control – circuit malfunction	Wiring, TP sensor, TCM
P1781	CAN data bus, ECM actual torque signal – malfunction detected	Wiring, ECM, TCM
P1790	CAN data bus, ECM/TCM communication – malfunction detected	Wiring, ECM, TCM
P1792	CAN data bus, ECM/TCM communication – malfunction detected	Wiring, ECM, TCM
P1800	System voltage, ignition – out of limits	Wiring, battery, alternator
P1811	AT torque control, signal – malfunction	Wiring, ECM, TCM
P1813	AT torque control, signal – malfunction	Wiring, ECM, TCM
P1835	Transmission kick-down switch – circuit malfunction	Wiring, transmission kick-down switch, TCM
P1842	Throttle position (TP) sensor – signal out of range	Wiring, TP sensor, ECM, TCM
P1843	Engine coolant temperature (ECT) sensor – signal out of range	Wiring, ECT switch, ECM, TCM
P1844	Engine control module (ECM), torque control – signal out of range	Wiring, ECM, TCM
P1845	Transmission ratio monitor – circuit malfunction	Wiring, TCM
P1847	Transmission control module (TCM), multiplexing – no signal	Wiring, TCM
P1850	Shift solenoid (SS) 'C', band apply – circuit malfunction	Wiring, SS
P1860	Torque converter clutch (TCC) solenoid – circuit malfunction	Wiring, TCC solenoid
P1870	Torque converter clutch (TCC) – inoperative	TCC mechanical failure
P1890	Throttle position (TP) sensor – circuit malfunction	Wiring, TP sensor, TCM
P1895	Engine control module (ECM), actual torque signal – circuit malfunction	Wiring, ECM, TCM
U2101	CAN data bus – program malfunction	Wiring, ECM programming
U2103	Engine control module (ECM), CAN data bus – malfunction detected	Wiring
U2104	Engine control module (ECM), CAN data bus – malfunction detected	Wiring
U2105	Engine control module (ECM)/CAN data bus communication – malfunction	Wiring, ECM
U2106	Engine control module (ECM)/transmission control module (TCM) communication, CAN data bus – malfunction	Wiring
U2107	Engine control module (ECM)/multifunction control module communication, CAN data bus – malfunction	Wiring
U2108	Engine control module (ECM)/ABS control module/traction control module communication, CAN data bus	Wiring

1 Frontera-B

2 Vectra-C



Model: Corsa-B/Tigra • Astra-F • Cavalier/Vectra  
Carlton/Omega • Senator-B • Calibra • Sintra

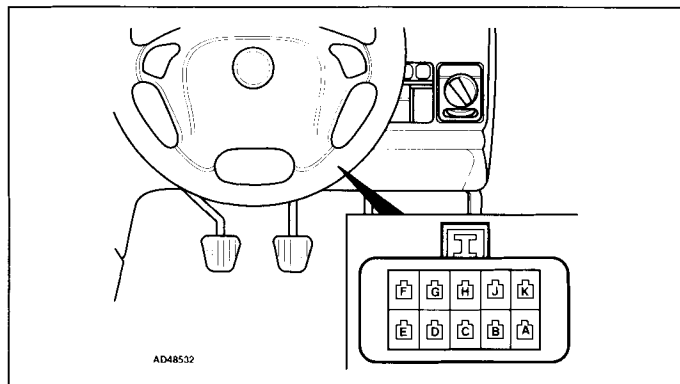
Year: 1988-00

**OPEL-VAUXHALL**

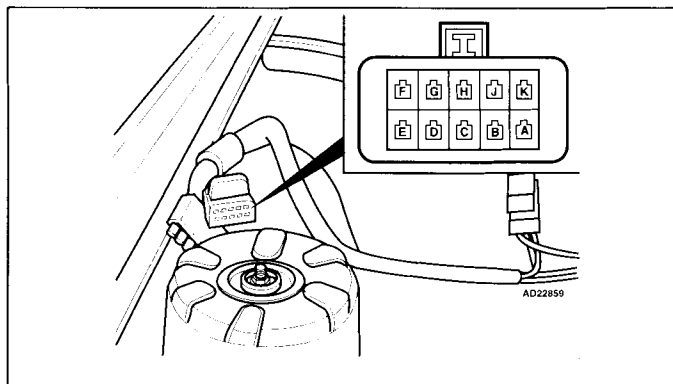


Transmission

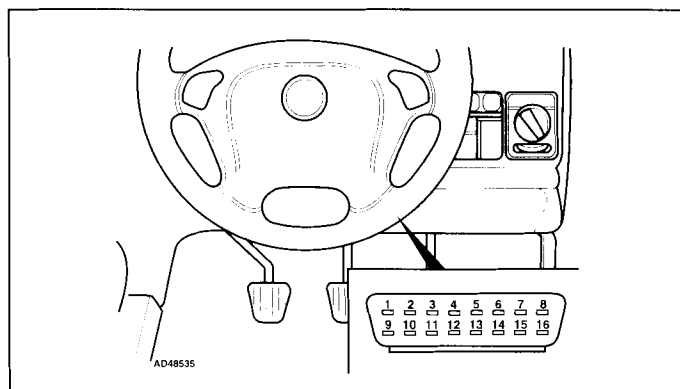
### Data link connector (DLC) locations



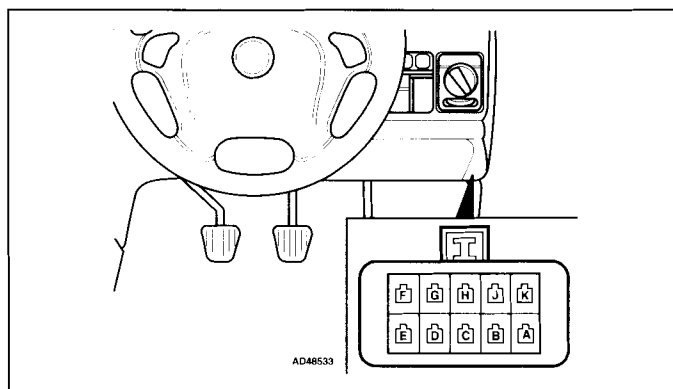
10-pin – Corsa-B/Astra-F/Tigra



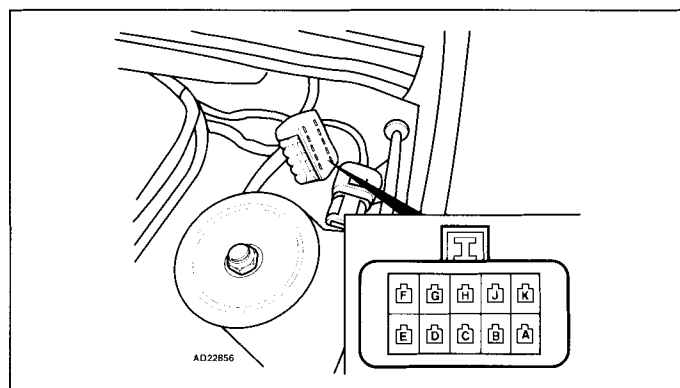
10-pin – Carlton/Omega/Senator



16-pin – Corsa-B/Astra-F/Tigra



10-pin – Sintra



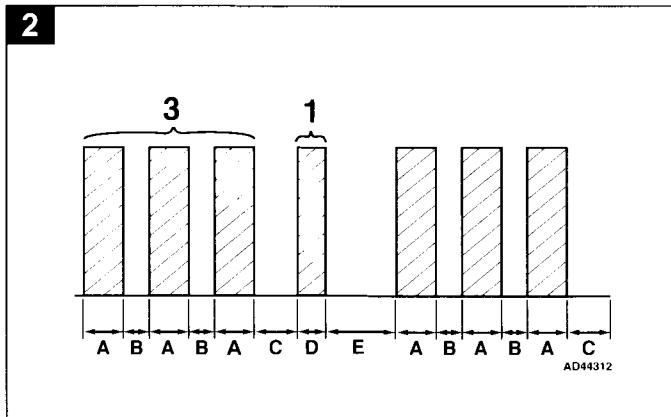
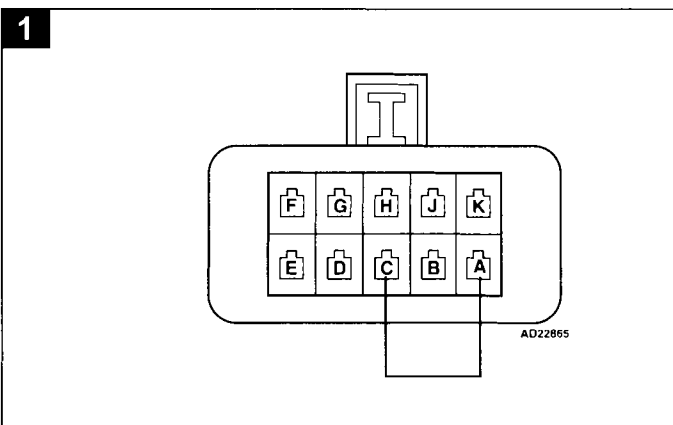
10-pin – Cavalier/Vectra/Calibra

**Trouble codes****Automatic****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the transmission sport mode warning lamp.
- The TCM fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

**Accessing – →07/91**

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals A and C **1**.
- Switch ignition ON.
- Count transmission sport mode warning lamp flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of two groups of one or more flashes.
- The first group of flashes indicate the 'tens' of the trouble code **2** [A].
- The second group of flashes indicate the 'units' of the trouble code **2** [D].
- A short pause separates each trouble code group **2** [C].
- A long pause separates each trouble code **2** [E].
- For example: Trouble code 31 displayed **2**.
- Each trouble code including 12 displayed three times.

**Erasing – →07/91**

- Switch ignition OFF.
- Disconnect battery earth lead for 60 seconds.

**WARNING:** Disconnecting battery may erase memory from electronic units (e.g. radio, clock).

- Repeat checking procedure to ensure no data remains in ECM fault memory.

**Accessing and erasing – 08/91 →**

- The transmission control module (TCM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification – all models**

Flash/scanner type	Fault location	Probable cause
12	Start and end of diagnosis	–
15	Engine coolant temperature (ECT) switch – voltage high	Wiring open circuit/short to positive, ECT switch, ECM
17	Shift solenoid (SS) 1, 1st-2nd/3rd-4th – voltage low	Wiring short to earth, shift solenoid
21	Throttle position (TP) sensor 1 – voltage high	Wiring open circuit/short to positive, TP sensor, TCM, ECM
22	Throttle position (TP) sensor 1 – voltage low	Wiring short to earth, TP sensor, TCM, ECM





Flash/scanner type	Fault location	Probable cause
23	Engine coolant temperature (ECT) switch – voltage high	Wiring open circuit/short to positive, ECT switch, ECM
25	Shift solenoid (SS) 1, 1st-2nd/3rd-4th – voltage high	Wiring open circuit, shift solenoid
26	Shift solenoid (SS) 2, 2nd-3rd – voltage low	Wiring short to earth, shift solenoid
28	Shift solenoid (SS) 2, 2nd-3rd – voltage high	Wiring open circuit, shift solenoid
29	Torque converter clutch (TCC) solenoid – voltage low	Wiring short to earth, TCC solenoid
31	Engine speed (RPM) – no signal	Wiring, tachometer, ECM, TCM
32	Transmission fluid pressure (TFP) solenoid – voltage low	Wiring short to earth, TFP solenoid
33	Transmission fluid pressure (TFP) solenoid – voltage high	Wiring short to positive, TFP solenoid
34	Shift solenoid (SS) 3, band apply – voltage high	Wiring short to positive, shift solenoid
35	Shift solenoid (SS) 3, band apply – voltage low	Wiring short to earth, shift solenoid
36	Torque converter clutch (TCC) solenoid – voltage high	Wiring open circuit, TCC solenoid
38	Transmission speed sensor, input – no signal	Wiring, transmission speed sensor, TCM
39	Transmission speed sensor, output – no signal	Wiring, transmission speed sensor, TCM
41	Gear selection – incorrect	Low fluid level, shift solenoid 1, 2 or 3, TCM
42	Transmission fluid pressure (TFP) solenoid – short circuit	Wiring, TFP solenoid, TCM
43	Transmission control, earth signals – unauthorised voltage change	Wiring, TCM
46	Gear selection, incorrect – down shift above maximum permitted engine speed	Wiring, RPM sensor, TCM
47	Down shifting above maximum permitted engine speed – incorrect shift	Wiring, transmission input speed sensor, TCM
48	Battery supply voltage – low	Wiring, battery, ECM relay, ECM
49	Battery supply voltage – high	Alternator, regulator
55	Transmission control module (TCM) – defective	TCM
56	Transmission range (TR) switch – incorrect signal	Wiring, TR switch, TCM
57	Throttle position (TP) sensor 2 – voltage low	Wiring, TP sensor, TCM
58	Throttle position (TP) sensor 2 – voltage high	Wiring, TP sensor, TCM
59	Park/neutral position (PNP) switch – incorrect signal	Wiring, PNP switch, TCM
61	Neutral control solenoid – voltage low	Wiring short to earth, neutral control solenoid
62	Neutral control solenoid – voltage high	Wiring open circuit/short to positive, neutral control solenoid
65	Transmission fluid temperature (TFT) sensor – voltage high	Wiring short to positive, TFT sensor, TCM
66	Transmission fluid temperature (TFT) sensor – RWD – voltage low	Wiring short to earth, TFT sensor, TCM
	Transmission fluid temperature (TFT) sensor – FWD – voltage high	Wiring short to positive, TFT sensor, TCM
67	Transmission fluid temperature (TFT) sensor – voltage low	Wiring short to positive, TFT sensor, TCM
74	Throttle position (TP) sensor 2 – incorrect signal	Wiring, TP sensor, TCM
75	Torque control signal – voltage low	Wiring, ECM, TCM
76	Throttle position (TP) sensor 1 – incorrect signal	Wiring, TP sensor, TCM, ECM
77	Transmission kick-down switch – voltage low	Wiring, kick-down switch



**Transmission**

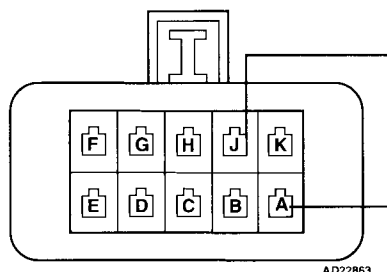
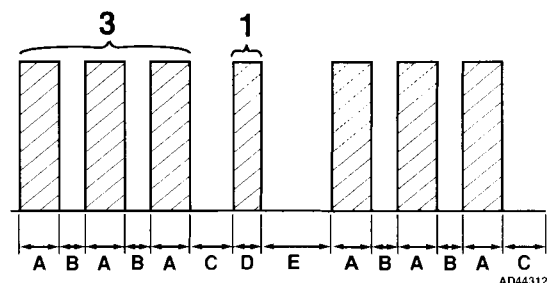
Flash/scanner type	Fault location	Probable cause
78	Gear selection – shift time excessive	Wiring, TCM
82	Transmission range (TR) switch – incorrect signal	Wiring, TR switch, TCM
83	Torque control – voltage high	Wiring short to positive, ECM, TCM
84	Brake pedal position (BPP) switch – voltage low	Wiring short to earth, BPP switch, TCM

**Cavalier/Vectra/Calibra – 4WD, MT****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the four wheel drive warning lamp.
- The four wheel drive control module fault memory can also be checked using diagnostic equipment connected to the data link connector (DLC).

**Accessing – →07/93**

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminals A and J **3**.
- Switch ignition ON.
- Count four wheel drive warning lamp flashes. Note trouble codes. Compare with trouble code table.
- Each trouble code consists of two groups of one or more flashes.
- The first group of flashes indicate the 'tens' of the trouble code **4** [A].
- The second group of flashes indicate the 'units' of the trouble code **4** [D].
- A short pause separates each trouble code group **4** [C].
- A long pause separates each trouble code **4** [E].
- For example: Trouble code 31 displayed **4**.
- Each trouble code including 12 displayed three times.

**3****4****Erasing – →07/93**

- Switch ignition OFF.
- Remove bridge wire from data link connector (DLC) terminals A and J **4**.
- Cycle ignition switch ON and OFF 16 times to erase trouble codes.
- Repeat checking procedure to ensure no data remains in four wheel drive control module fault memory.

**Accessing and erasing – 08/93 →**

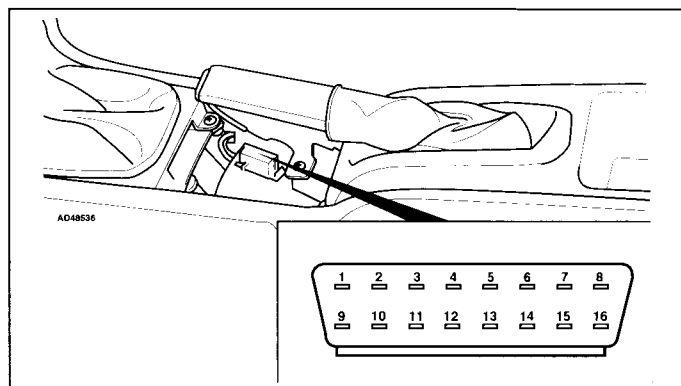
- The four wheel drive control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).



### Trouble code identification

Flash/ scanner type	Fault location	Probable cause
12	Start and end of diagnosis	–
15	Transmission fluid temperature (TFT) sensor – voltage high	Wiring open circuit, TFT sensor
24	Vehicle speed sensor (VSS) – no signal	Wiring, VSS, four wheel drive control module
31	Engine speed (RPM) – no signal	Wiring, ECM, four wheel drive control module
32	Four wheel drive pressure switch – no signal	Wiring, pressure switch, four wheel drive control module
33	Four wheel drive control solenoid – voltage high	Wiring open circuit, four wheel drive control solenoid, four wheel drive control module
34	Four wheel drive control solenoid – voltage low	Wiring short to earth, four wheel drive control solenoid, four wheel drive control module
37	Brake pedal position (BPP) switch – no signal	Wiring, fuse, BPP switch
39	ABS control module – no signal	Wiring open circuit, front wheel speed sensor(s)
55	Four wheel drive control module – defective	Four wheel drive control module
71	Brake pedal position (BPP) switch – voltage high	Wiring, fuse, BPP switch
72	Brake pedal position (BPP) switch – voltage low	Wiring short to earth, fuse, BPP switch
73	Brake pedal position (BPP) switch – vehicle stopped without BPP switch signal	Wiring, BPP switch
74	Four wheel drive pressure switch – low pressure	Wiring, pressure switch, four wheel drive control module
75	Transmission fluid temperature (TFT) sensor – voltage low	Wiring, TFT sensor



**Data link connector (DLC) locations****Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

**Accessing and erasing**

- The transmission control module (TCM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

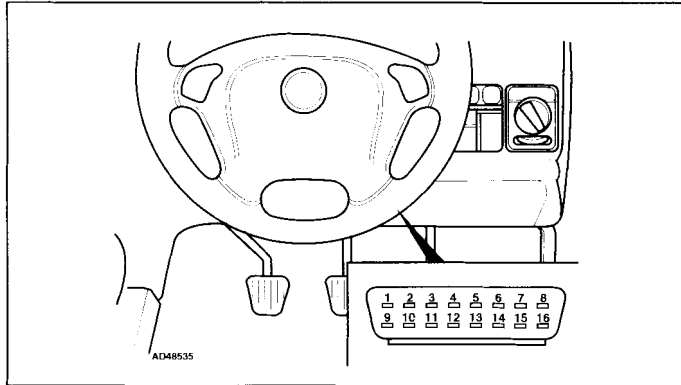
**Trouble code identification**

Scanner type	Fault location	Probable cause
17	Shift solenoid (SS) 1, 1st-2nd/3rd-4th – voltage low	Wiring short to earth, shift solenoid
25	Shift solenoid (SS) 1, 1st-2nd/3rd-4th – voltage high	Wiring open circuit, shift solenoid
26	Shift solenoid (SS) 2, 2nd-3rd – voltage low	Wiring short to earth, shift solenoid
28	Shift solenoid (SS) 2, 2nd-3rd – voltage high	Wiring open circuit, shift solenoid
29	Torque converter clutch (TCC) solenoid – voltage low	Wiring short to earth, TCC solenoid
31	Engine speed (RPM) – no signal	Wiring, tachometer, ECM, TCM
32	Transmission fluid pressure (TFP) solenoid – voltage low	Wiring short to earth, TFP solenoid
33	Transmission fluid pressure (TFP) solenoid – voltage high	Wiring short to positive, TFP solenoid
36	Torque converter clutch (TCC) solenoid – voltage high	Wiring open circuit, TCC solenoid
38	Transmission speed sensor, input – no signal	Wiring, transmission speed sensor, TCM
39	Transmission speed sensor, output – no signal	Wiring, transmission speed sensor, TCM
41	Gear selection – incorrect	Low fluid level, shift solenoid 1, 2 or 3, TCM
42	Transmission fluid pressure (TFP) solenoid – short circuit	Wiring, TFP solenoid, TCM
47	Down shifting above maximum permitted engine speed – incorrect shift	Wiring, transmission input speed sensor, TCM
48	Supply voltage, ignition – low	Wiring, battery, ECM relay, ECM



Scanner type	Fault location	Probable cause
49	Supply voltage, ignition – high	Alternator, regulator
56	Transmission range (TR) switch – incorrect signal	Wiring, TR switch, TCM
57	Throttle position (TP) sensor 2 – voltage low	Wiring, TP sensor, TCM
58	Throttle position (TP) sensor 2 – voltage high	Wiring, TP sensor, TCM
59	Park/neutral position (PNP) switch – incorrect signal	Wiring, PNP switch, TCM
61	Neutral control solenoid – voltage low	Wiring short to earth, neutral control solenoid
62	Neutral control solenoid – voltage high	Wiring open circuit/short to positive, neutral control solenoid
66	Transmission fluid temperature (TFT) sensor – voltage high	Wiring short to positive, TFT sensor, TCM
67	Transmission fluid temperature (TFT) sensor – voltage low	Wiring short to positive, TFT sensor, TCM
74	Throttle position (TP) sensor 2 – incorrect signal	Wiring, TP sensor, TCM
75	Engine control module (ECM), torque control signal – voltage low	Wiring short to earth, ECM, TCM
76	Throttle position (TP) sensor 1 – incorrect signal	Wiring, TP sensor, TCM, ECM
77	Transmission kick-down switch – voltage low	Wiring, kick-down switch,
78	Gear selection – shift time excessive	Wiring, TCM
81	Transmission clutch C1, neutral control solenoid on – no engagement	Wiring, PNP switch, ECM, TCM
82	Transmission clutch C1, neutral control solenoid on – no release	Wiring, PNP switch, ECM, TCM
83	Transmission clutch C1, neutral control solenoid on – slipping	Wiring, ECM, TCM
84	Transmission clutch C1, neutral control solenoid off – slipping	Wiring, ECM, TCM



**Data link connector (DLC) locations****Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

**Accessing and erasing**

- The transmission control module (TCM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**Trouble code identification**

Scanner type	Fault location	Probable cause
10	Transmission control module (TCM) – coding	TCM incorrectly programmed
13	Torque converter clutch (TCC) solenoid – open circuit	Wiring, TCC solenoid
14	Transmission fluid pressure (TFP) solenoid – open circuit	Wiring, TFP solenoid
15	Shift solenoid (SS) 1, 1st-2nd/3rd-4th – open circuit	Wiring, shift solenoid
16	Shift solenoid (SS) 2, 2nd-3rd – open circuit	Wiring, shift solenoid
17	Shift solenoid (SS) 1, 1st-2nd/3rd-4th – voltage low	Wiring short to earth, shift solenoid
18	Shift solenoid (SS) 2, 2nd-3rd – voltage low	Wiring short to earth, shift solenoid
25	Shift solenoid (SS) 1, 1st-2nd/3rd-4th – voltage high	Wiring open circuit/short to positive, shift solenoid
28	Shift solenoid (SS) 2, 2nd-3rd – voltage high	Wiring open circuit/short to positive, shift solenoid
29	Torque converter clutch (TCC) solenoid – voltage low	Wiring short to earth, TCC solenoid
31	Engine speed (RPM) – no signal	Wiring, tachometer, ECM, TCM
32	Transmission fluid pressure (TFP) solenoid – voltage low	Wiring short to earth, TFP solenoid
33	Transmission fluid pressure (TFP) solenoid – voltage high	Wiring short to positive, TFP solenoid
34	Shift solenoid (SS) 3, band apply – voltage high	Wiring short to positive, shift solenoid
35	Shift solenoid (SS) 3, band apply – voltage low	Wiring short to earth, shift solenoid
36	Torque converter clutch (TCC) solenoid – voltage high	Wiring open circuit/short to positive, TCC solenoid
39	Transmission speed sensor, output – no signal	Wiring, transmission speed sensor, TCM



Scanner type	Fault location	Probable cause
41	Gear selection – incorrect	Low fluid level, shift solenoid 1, 2 or 3, TCM
44	Shift solenoid (SS) 3, band apply – open circuit	Wiring, shift solenoid
45	Supply voltage, battery – low	Wiring, battery, TCM
48	Supply voltage, ignition – low	Wiring, battery, ECM relay, ECM
49	Supply voltage, ignition – high	Alternator, regulator
51	Transmission control module (TCM) – initiation defect	TCM failure
55	Transmission control module (TCM) – defective	TCM
56	Transmission range (TR) switch – incorrect signal	Wiring, TR switch, TCM
57	Throttle position (TP) sensor 2 – voltage low	Wiring, TP sensor, TCM
58	Engine control module (ECM), torque reduction signal – voltage low	Wiring short to earth, ECM, TCM
59	Park/neutral position (PNP) switch – voltage low	Wiring short to earth, PNP switch, TCM
60	Solenoid valves, supply voltage – circuit malfunction	Wiring open circuit, TCM
61	TCM internal control relay, solenoid valve supply voltage – circuit malfunction	Wiring short to positive, TCM
62	TCM internal control relay, solenoid valve supply voltage – circuit malfunction	Wiring short to earth, TCM
63	TCM internal control relay, solenoid valve supply voltage – circuit malfunction	Wiring open circuit, TCM
64	TCM internal control relay, solenoid valve supply voltage – malfunction	TCM
65	Transmission fluid temperature (TFT) sensor – voltage high	Wiring short to positive, TFT sensor, TCM
66	Transmission fluid temperature (TFT) sensor – voltage low	Wiring short to earth, TFT sensor, TCM
68	Transmission fluid temperature (TFT) sensor – signal out of range	Wiring, TFT sensor, TCM
69	Park/neutral position (PNP) switch – voltage high	Wiring short to positive, PNP switch, TCM
71	Throttle position (TP) sensor – voltage high	Wiring, TP sensor, TCM
72	Throttle position (TP) sensor – signal out of range	Wiring, TP sensor, ECM, TCM
73	Engine coolant temperature (ECT) sensor – signal out of range	Wiring, ECT switch, ECM, TCM
74	Throttle position (TP) sensor – voltage low	Wiring short to earth, TP sensor, TCM, ECM
75	Engine control module (ECM), torque control signal – voltage high	Wiring short to positive, ECM, TCM
76	Throttle position (TP) sensor – incorrect signal	Wiring, TP sensor, TCM, ECM
77	Transmission kick-down switch – voltage low	Wiring short to earth, kick-down switch
81	Engine control module (ECM), torque reduction signal – voltage high	Wiring open circuit/short to positive, ECM, TCM
82	Transmission range (TR) switch – incorrect signal	Wiring, TR switch, TCM
83	Engine control module (ECM), torque control signal – voltage low	Wiring short to earth, ECM, TCM
84	Brake pedal position (BPP) switch – voltage low	Wiring short to earth, BPP switch, TCM
85	Engine control module (ECM), torque control – incorrect signal	Wiring, ECM, TCM
89	Engine control module (ECM), torque reduction – incorrect signal	Wiring open circuit/short to positive, ECM, TCM
91	Transmission control module (TCM)/ABS/traction control module communication – voltage high	Wiring short to positive, TCM, ABS/traction control module
92	Transmission control module (TCM)/ABS/traction control module communication – voltage low	Wiring short to earth, TCM, ABS/traction control module





# VAUXHALL-OPEL

Model:

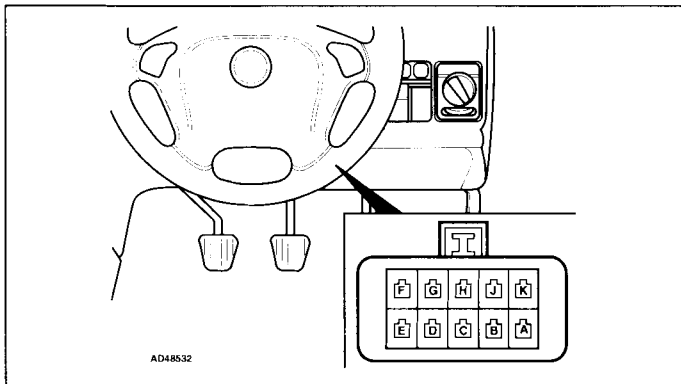
Corsa-B/Tigra • Astra-F • Vectra-A/Cavalier  
Vectra-B/Calibra • Omega-B • Sintra • Frontera

Year:

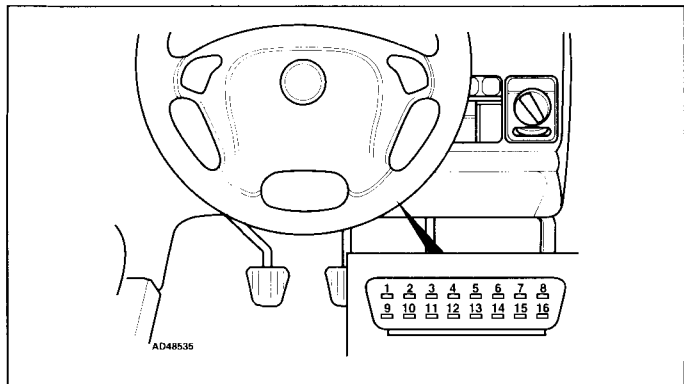
1994-00

Immobilizer

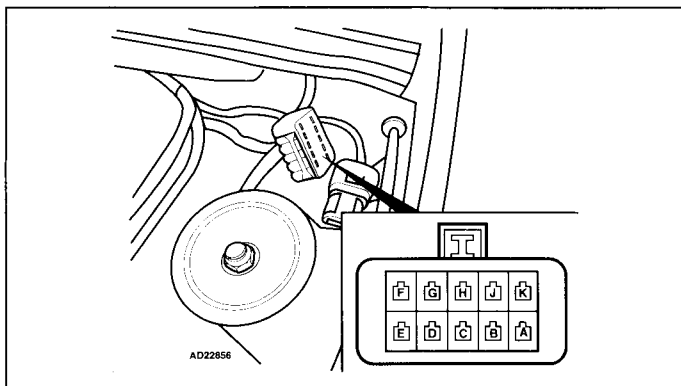
## Data link connector (DLC) locations



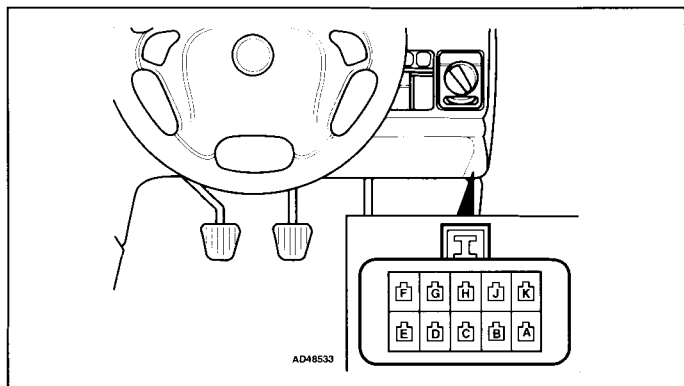
Corsa-B/Astra-F/Tigra



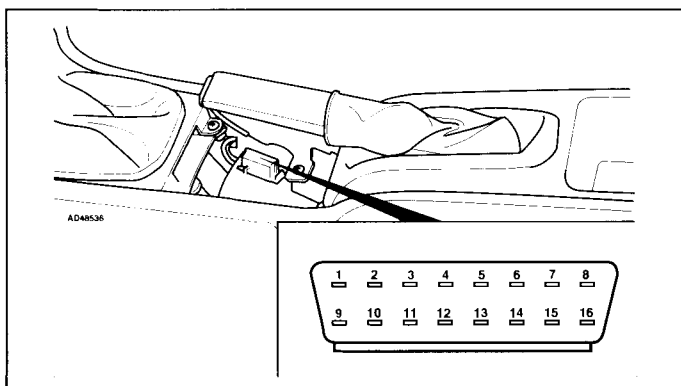
Omega-B



Cavalier/Vectra-A/Calibra



Frontera/Sintra



Vectra-B





## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The immobilizer control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

Scanner type	Fault location	Probable cause
11	Ignition key – no signal	Wiring, incorrect/defective ignition key
12	Ignition key – incorrect signal	Incorrect ignition key, ignition key not programmed
13	Immobilizer control module – coding	Immobilizer control module programming
14	Immobilizer control module, ignition key(s) – programming	No ignition keys programmed
15	Vehicle speed sensor (VSS) – voltage low	Wiring open circuit/short to earth
16	Vehicle speed sensor (VSS) – voltage high	Wiring short to positive
17	Immobilizer control module/engine control module (ECM) communication – no ECM signal	Wiring, ECM
18	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring
19	Immobilizer warning lamp – without alarm system – voltage low	Wiring open circuit/short to earth
	Alarm system control module, signal – voltage low	Wiring short to earth
20	Immobilizer warning lamp – without alarm system – voltage high	Wiring short to positive
	Alarm system control module, signal – voltage high	Wiring short to positive
21	Immobilizer relay – voltage low	Wiring open circuit/short to earth
22	Immobilizer relay – voltage high	Wiring short to positive
52	Immobilizer control module – defective	Immobilizer control module
55	Immobilizer control module – defective	Immobilizer control module





# VAUXHALL-OPEL

Model:

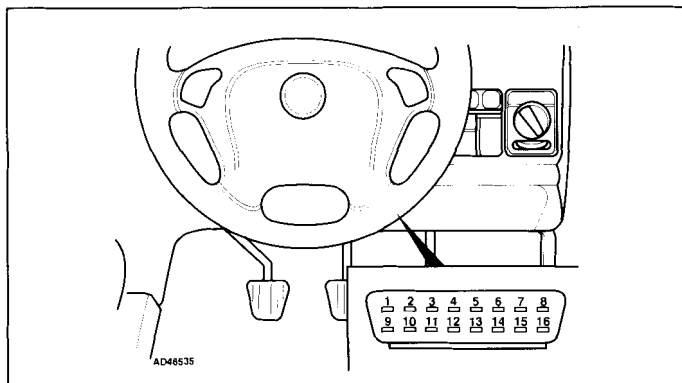
Corsa-C • Astra-G • Vectra-B • Omega-B  
Zafira • Frontera-B

Year:

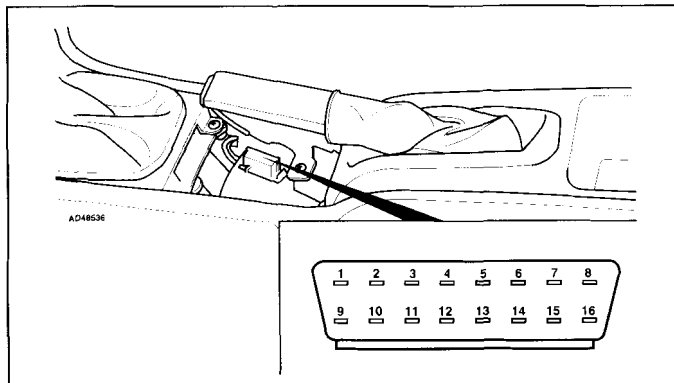
1998-02

Immobilizer

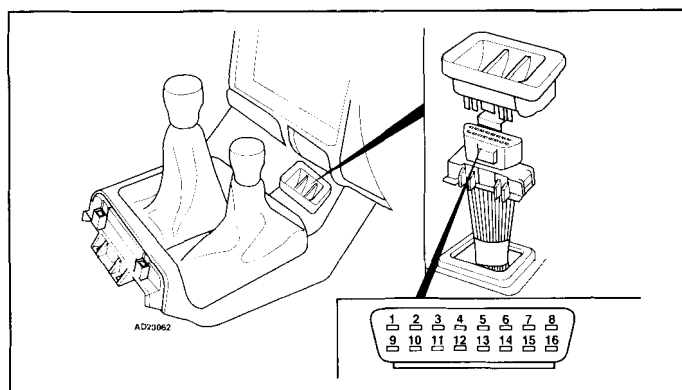
## Data link connector (DLC) locations



Omega-B



Corsa-C/Astra-G/Vectra-B/Zafira



Frontera-B

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The immobilizer control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).



### Trouble code identification

B type	Fault location	Probable cause
B0001	Immobilizer control module – defective	Immobilizer control module
B0002	Immobilizer control module – coding	Immobilizer control module programming
B0003	Ignition key – incorrect signal	Incorrect ignition key
B0004	Reader coil – circuit malfunction	Wiring, reader coil
B0005	Immobilizer control module/engine control module (ECM) communication – voltage low	Wiring short to earth
B0006	Immobilizer control module/engine control module (ECM) communication – voltage high	Wiring short to positive
B0007	Immobilizer control module/engine control module (ECM) communication – no ECM signal	Wiring, ECM
B0008	Ignition key – incorrect signal	Incorrect ignition key
B0009	Immobilizer control module, ignition key(s) – programming	No ignition keys programmed
B0010	Ignition key, transponder type – incorrect	Incorrect ignition key
B1000	Immobilizer control module – defective	Immobilizer control module
B3040	Immobilizer control module/engine control module (ECM) communication – signal interrupted	Wiring, immobilizer control module, ECM
B3042	Immobilizer control module/engine control module (ECM) communication – voltage low	Wiring short to earth
B3043	Immobilizer control module/engine control module (ECM) communication – voltage high	Wiring short to positive
B3045	Immobilizer control module, alarm system signal – voltage low	Wiring short to earth
B3048	Immobilizer control module, alarm system signal – voltage high	Wiring short to positive
B3055	Ignition key – no signal	Wiring, incorrect ignition key, defective key
B3056	Immobilizer control module, ignition key(s) – programming	No ignition keys programmed
B3057	Immobilizer control module – coding	Immobilizer control module programming
B3059	Immobilizer control module/engine control module (ECM) communication – no ECM signal received	Wiring, ECM
B3060	Ignition key – incorrect signal	Incorrect ignition key
B3061	Ignition key/engine control module (ECM) coding – no match	Incorrect ignition key, ECM programming
B3077	Ignition key, transponder type – incorrect	Incorrect ignition key





# VOLKSWAGEN

**Model:** Lupo • Polo 1,3 • Polo/Classic/Estate • Golf/Vento/Bora/Cabrio • Beetle • Passat • Corrado (08/92-95)  
Sharan • Caddy/Pickup • Transporter/Caravelle • LT 2,5 SDI/TDI

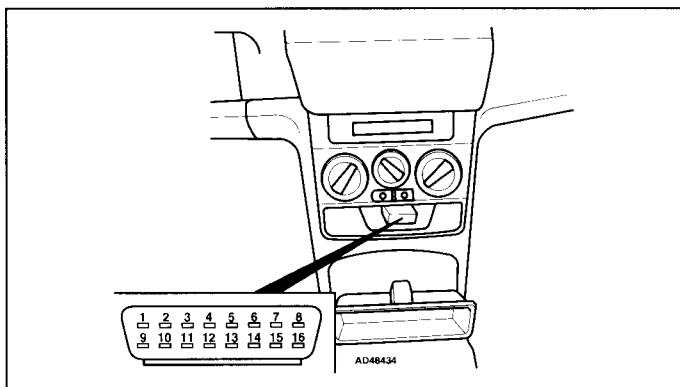
**Year:** 1990-04

**Engine code:** 1Y, 1Z, 2E, 3F, AAA, AAC, AAF, AAZ, ABF, ABV, ACK, ACU, ACV, ADP, ADR, ADY, AEB, AEE, AEF, AEH, AEK, AER, AES, AET, AEX, AEY, AFB, AFH, AFK, AFN, AFT, AGD, AGE, AGG, AGK, AGN, AGP, AGR, AGU, AGX, AGZ, AHB, AHD, AHF, AHG, AHH, AHL, AHT, AHU, AHW, AHY, AJH, AJM, AJT, AJV, AKK, AKL, AKN, AKP, AKQ, AKR, AKS, AKT, AKU, AKV, AKW, ALD, ALE, ALG, ALH, ALL, ALM, ALT, ALZ, AMF, AMV, AMX, AMY, ANA, ANB, ANJ, ANU, ANV, ANW, ANX, ANY, APA, APE, APF, APK, APL, APQ, APR, APT, APU, AQA, AQD, AQM, AQN, AQP, AQQ, AQY, ARC, ARG, ARL, ARM, ARR, ARZ, ASV, ASX, ASY, ASZ, ATA, ATD, ATJ, ATM, ATN, ATU, ATX, AUA, AUB, AUC, AUD, AUE, AUF, AUM, AUQ, AUR, AUS, AUZ, AVB, AVC, AVF, AVG, AVT, AVU, AVY, AWC, AWF, AWG, AWH, AWT, AWU, AWY, AWX, AXG, AXL, AXP, AXR, AXU, AYC, AYD, AYL, AYQ, AYZ, AZD, AZH, AZJ, AZM, AZQ, AZX, BAD, BAY, BBE, BBF, BBY, BBZ, BCA, BCB, BDE, BDG, BDN, BFH, BFQ, PG, PY

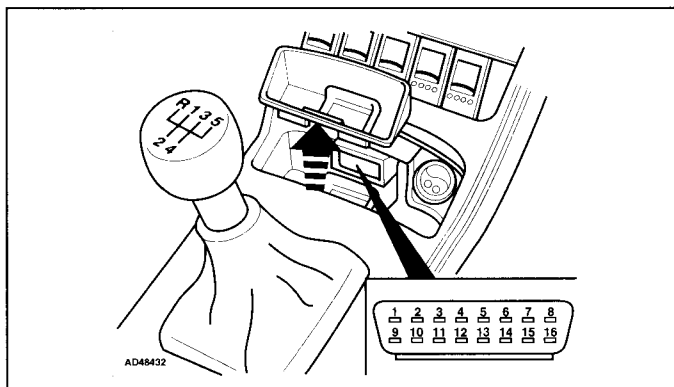
**System:** Bosch EDC/1.3.3/1.4 • Bosch EDC 15M/P/V • Bosch Motronic M2.7/2.9/2.9.1 • Bosch Motronic M3.2  
Bosch Motronic M3.8.1/2/3/4/5 • Bosch Motronic M5.9/5.9.2 • Bosch Motronic ME7.1/7.5/7.5.10  
Bosch Motronic MP9.0 • Bosch MSA 12/15/15.5 • Magneti Marelli 1AV/4AV/4CV/4LV/4MV • Siemens Simos  
VAG Digifant 3.0/3.2 • VAG Digifant ML5.4/5.5/5.9 • VAG Digifant MP4.1/2/3/4/7

## Engine management

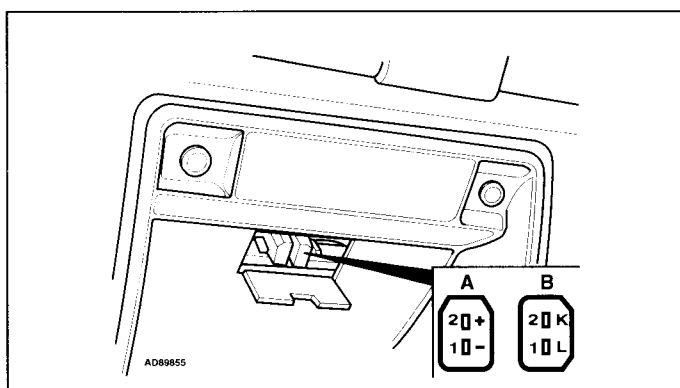
### Data link connector (DLC) locations



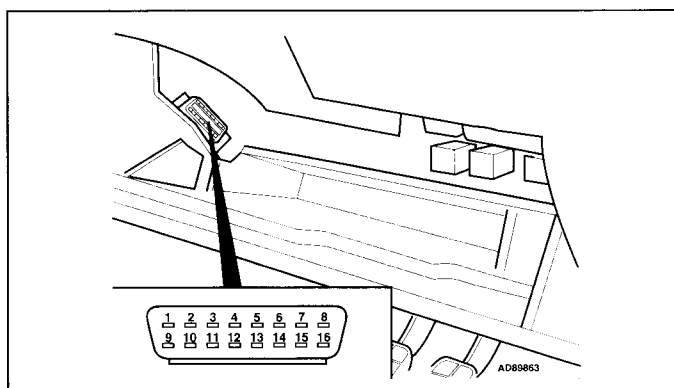
Lupo →04/00 (except 1,2 TDI) – behind storage compartment



Lupo 05/00 → (& 1,2 TDI), Polo/Classic/Estate 10/99-02 – under front ashtray



Polo →1994 – driver's glovebox



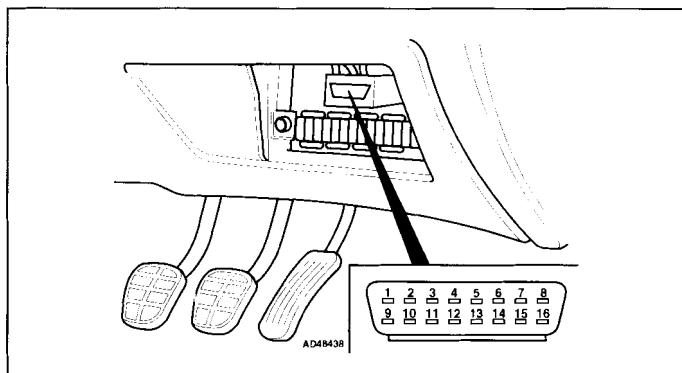
Polo 1994-07/97, Classic/Estate →09/99, Caddy – in glovebox, driver's side

Model: Lupo • Polo 1,3 • Polo/Classic/Estate • Golf/Vento/Bora/Cabrio  
Beetle • Passat • Corrado (08/92-95) • Sharan  
Caddy/Pickup • Transporter/Caravelle • LT 2,5 SDI/TDI

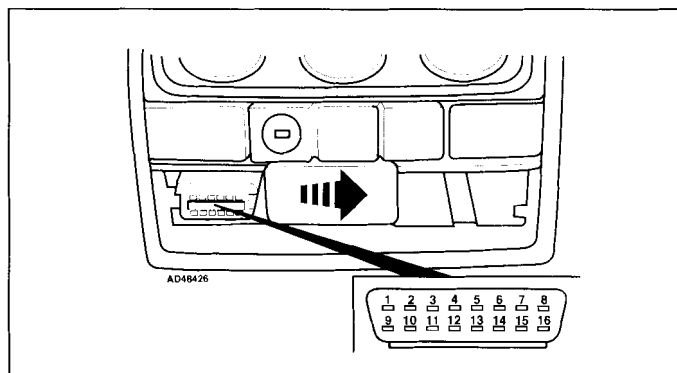
**VOLKSWAGEN**



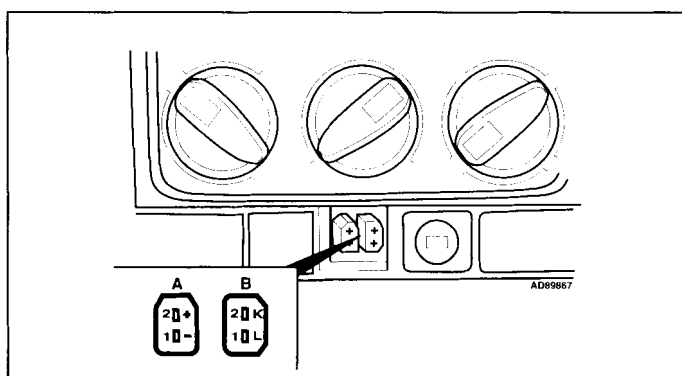
Engine management



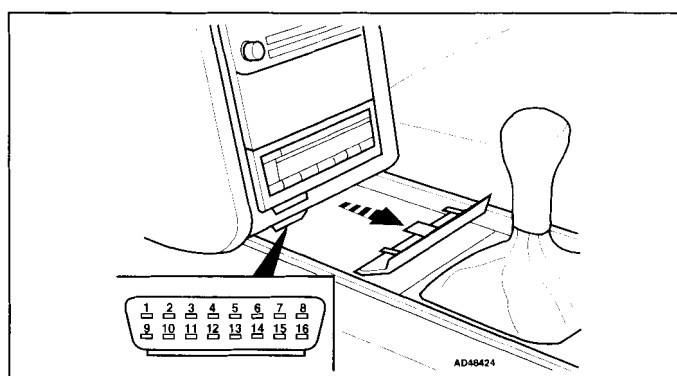
Polo 08/97-09/99 – in fascia fusebox



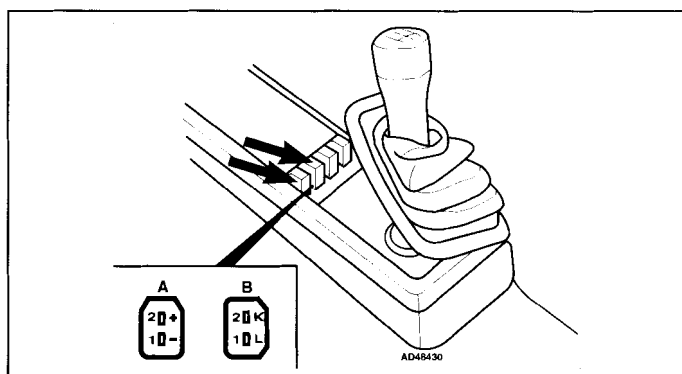
Golf 08/93-97, Vento 08/93 →, Cabrio – adjacent to ashtray



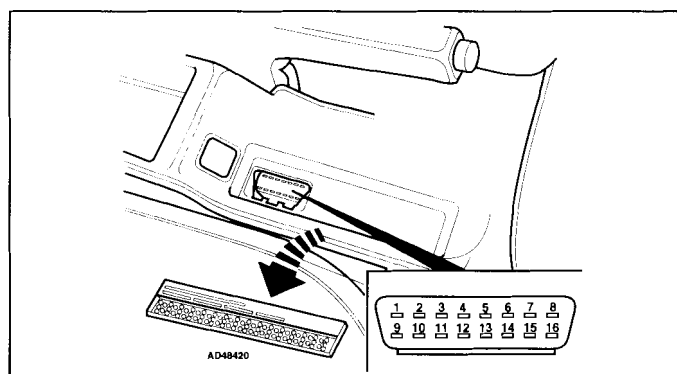
Golf/Vento →07/93 – below heater controls



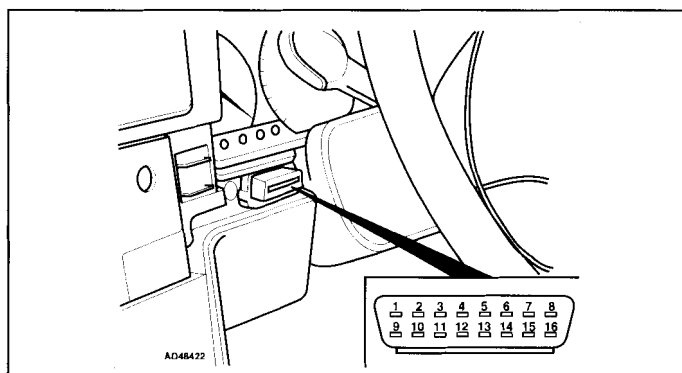
Golf 1997 →, Bora – centre console



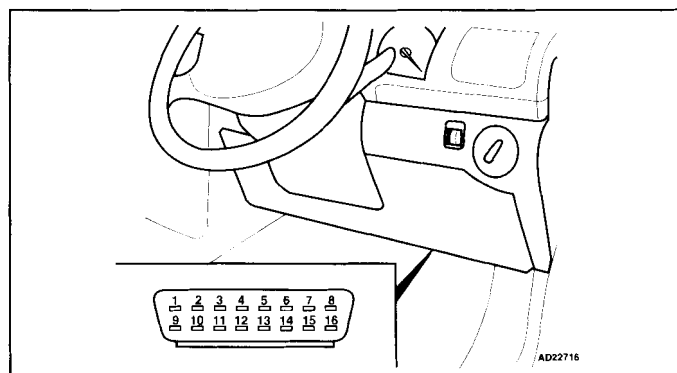
Passat →1993, Corrado →07/93 – centre console



Passat 1996-09/00 – near handbrake, below rubber mat



Passat 1994-96 – adjacent to steering column



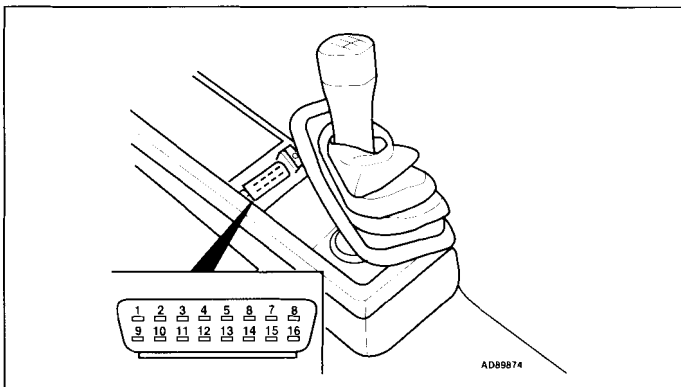
Beetle, Passat 10/00 →, Sharan 06/00 → – fascia, driver's side



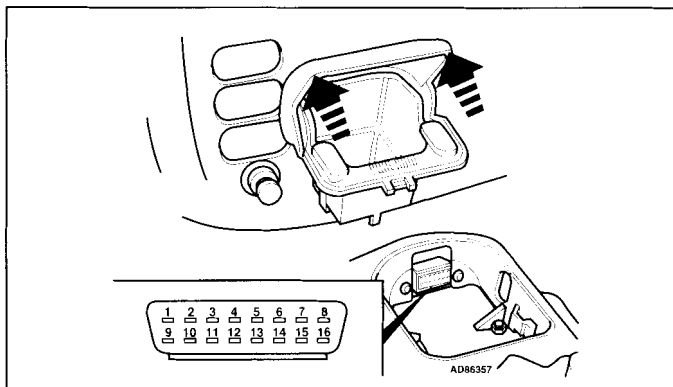
# VOLKSWAGEN

Model: Lupo • Polo 1,3 • Polo/Classic/Estate • Golf/Vento/Bora/Cabrio  
Beetle • Passat • Corrado (08/92-95) • Sharan  
Caddy/Pickup • Transporter/Caravelle • LT 2,5 SDI/TDI

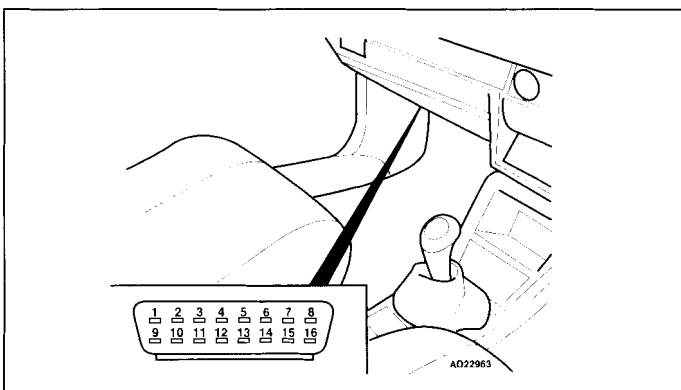
## Engine management



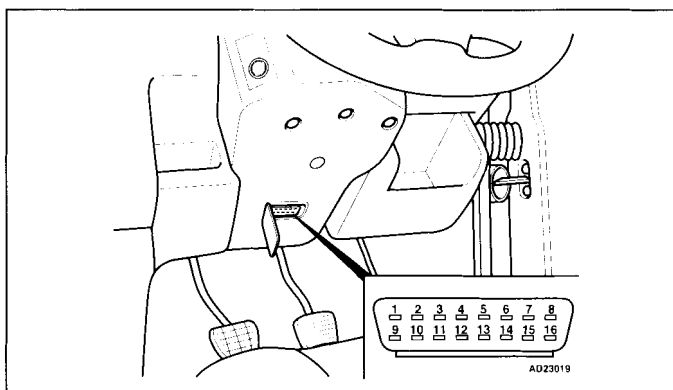
Corrado 08/93 → – centre console



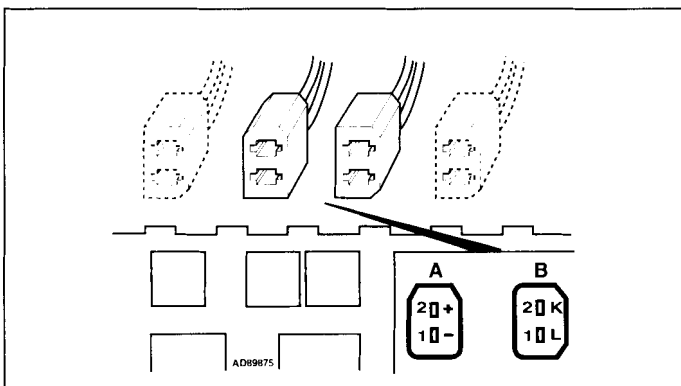
Sharan →05/00 – centre console



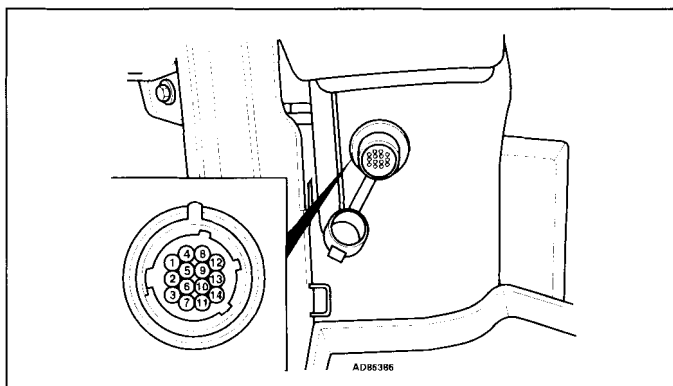
Caddy Pickup – fascia, passenger's side



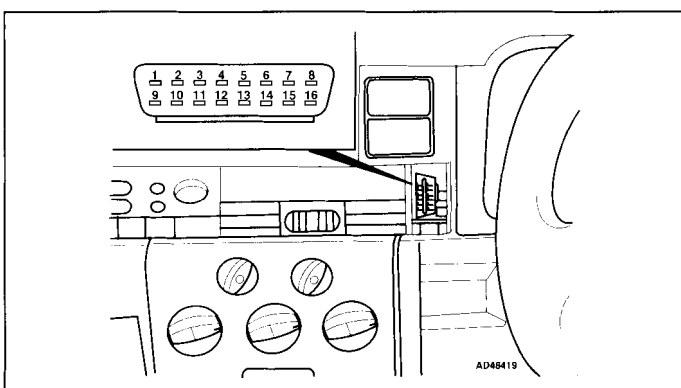
Transporter/Caravelle 09/98 → – fascia, driver's side



Transporter/Caravelle →1995 – above fascia fusebox/relay plate



LT – fascia



Transporter/Caravelle 1996-08/98 – adjacent to instrument panel



### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Carry out road test for at least 10 minutes.
- Except 2,8/2,9: Ensure accelerator pedal is briefly fully depressed and engine speed exceeds 3500 rpm.
- 2,8/2,9: Ensure accelerator pedal is briefly fully depressed and engine speed exceeds 4600 rpm.
- Automatic transmission in 'P' or 'N'.
- If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.
- Data link connector (DLC) – 2-pin: (A) black, (B) brown/white.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).
- Passat, engine code 2E: Self-diagnosis capability only available from 08/92.
- Engine code PG: Self-diagnosis capability only available from 08/92.
- Engine code 3F: Self-diagnosis capability only available from 10/90.
- Engine code PY: Self-diagnosis capability only available from 1991.
- Engine code 1Y/AAZ: Self-diagnosis capability only available from 10/94.

**NOTE:** *Self-diagnosis output using 4-digit trouble codes may not display all available diagnostic information (early models).*

#### Trouble code identification

VAG type 4-digit	Fault location	Probable cause
1111	Engine control module (ECM) – defective	ECM
1231	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
1232	Idle speed control (ISC) actuator	Throttle valve tight/sticking, wiring, multi-plug incorrectly wired, ISC actuator
2111 <b>1</b>	Crankshaft position (CKP) sensor	Air gap, metal particles, insecure sensor/rotor, wiring, CKP sensor
2113	Camshaft position (CMP) sensor	Air gap, insecure sensor/rotor, wiring, poor connection, fuse, distributor/camshaft alignment, CMP sensor
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
2141	Knock control – control limit exceeded	ECM
2142	Knock sensor (KS) 1	Wiring, KS, ECM
2144	Knock sensor (KS) 2	Wiring, KS, ECM
2212	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
2214	Maximum engine RPM exceeded	Incorrect gear shift, CKP/RPM sensor
2222	Manifold absolute pressure (MAP) sensor	TC wastegate regulating valve, hose connection(s), oil contamination, valve timing, poor connection, wiring, MAP sensor, ECM
2231	Idle speed control (ISC)	Intake leak/blockage, throttle valve tight/sticking, IAC valve or ISC actuator/position sensor
2234	Engine control module (ECM) – supply voltage	Fuse, alternator, battery, current draw with ignition OFF, engine control relay, wiring
2242	Mixture adjustment resistor	Wiring, mixture adjustment resistor
2243	Instrument panel, fuel consumption signal	Wiring short to positive, instrument panel
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2314	Engine/gearbox electrical connection	Wiring, transmission fault
2322	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
2323	Volume air flow (VAF) sensor	Intake leak, wiring, VAF sensor





## Engine management

VAG type 4-digit	Fault location	Probable cause
2324	Mass air flow (MAF) sensor	Intake leak, wiring, MAF sensor
2341	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, intake/exhaust leak, misfire, fuel level low, fuel pressure/pump, injector(s), EVAP canister purge valve, MAF sensor filament burn-off, wiring, HO2S
2342	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
2411	Exhaust gas recirculation temperature (EGRT) sensor	Wiring, EGRT sensor
2412	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
2413	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, MAF sensor filament burn-off, HO2S, EVAP canister purge valve, injector(s), excessive fuel in engine oil
3434	Oxygen sensor heater relay	Wiring, oxygen sensor heater relay
4312	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid
4332	Engine control module (ECM) – output stages	Wiring, ECM controlled components
4343	Evaporative emission (EVAP) canister purge valve	Wiring, fuse, EVAP canister purge valve
4411	Injector 1	Wiring, fuse, injector
4412	Injector 2	Wiring, fuse, injector
4413	Injector 3	Wiring, fuse, injector
4414	Injector 4	Wiring, fuse, injector
4421	Injector 5	Wiring, injector
4422	Injector 6	Wiring, injector
4431	Idle air control (IAC) valve	Wiring, IAC valve
4433	Fuel pump relay	Wiring, fuse, fuel pump relay
4444	No fault found	–

**i** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.

VAG type 5-digit	EOBD type	Fault location	Probable cause
–	P0	Refer to EOBD trouble code table	–
00000	–	No fault found	–
00263	–	Transmission control module (TCM) – incorrect signal	Wiring short to earth, TCM trouble code(s) stored, ECM
00268	–	Idle speed control (ISC) actuator	Wiring, ISC actuator
00281	–	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00282	–	Idle speed control (ISC) actuator/throttle motor	Throttle valve tight/sticking, wiring, multi-plug incorrectly wired, ISC actuator/throttle motor
00305	–	Instrument panel, fuel consumption signal	Wiring, instrument panel
00513 <b>i</b>	–	Crankshaft position (CKP) sensor	Air gap, metal particles, insecure sensor/rotor, wiring, CKP sensor
00514	–	Crankshaft position (CKP) sensor	Air gap, insecure sensor/rotor, wiring, poor connection, CKP sensor



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VAG type 5-digit	EOBD type	Fault location	Probable cause
00515	–	Except ACU/ADL: Camshaft position (CMP) sensor	Air gap, insecure sensor/rotor, wiring, poor connection, fuse, distributor/camshaft alignment, CMP sensor
00515	–	ACU/ADL: Crankshaft position (CKP) sensor	Air gap, insecure sensor/rotor, wiring, poor connection, fuse, distributor/camshaft alignment, CKP sensor
00516	–	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, throttle valve tight/sticking, wiring, CTP switch
00518	–	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00519	–	Manifold absolute pressure (MAP) sensor	TC wastegate regulating valve, hose connection (s), oil contamination, valve timing, poor connection, wiring, MAP sensor, ECM
00520	–	Mass air flow (MAF) sensor	Wiring, MAF sensor
00521	–	Mixture adjustment resistor	Wiring, mixture adjustment resistor
00522	–	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	–	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
00524	–	Knock sensor (KS) 1	Wiring, KS, ECM
00525	–	Heated oxygen sensor (HO2S) 1 – implausible signal	Wiring, HO2S, heating inoperative, fuel level low
00526	–	Stop lamp switch	Wiring, stop lamp switch
00527	–	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
00528	–	Barometric pressure (BARO) sensor	Wiring, BARO sensor
00529	–	Crankshaft position (CKP) sensor	Wiring, CKP sensor
00530	–	Idle speed control (ISC) actuator/position sensor	Wiring, poor connection, multi-plug incorrectly wired, ISC actuator/position sensor
00532	–	Engine control module (ECM) – supply voltage	Fuse, alternator, battery, current draw with ignition OFF, engine control relay, wiring
00533	–	Idle speed control (ISC)	Intake leak/blockage, throttle valve tight/sticking, IAC valve or ISC actuator/position sensor
00534	–	Engine oil temperature (EOT) sensor	Wiring, EOT sensor
00535	–	Engine control module (ECM) – knock control 1	Wiring, KS, ECM
00536	–	Engine control module (ECM) – knock control 2	Wiring, KS, ECM
00537	–	Heated oxygen sensor (HO2S) – lambda control	CO adjustment, heating inoperative, intake/exhaust leak, misfire, fuel level low, fuel pressure/pump, injector(s), EVAP canister purge valve, MAP sensor, MAF sensor filament burn-off, wiring, HO2S
00539	–	Fuel temperature sensor	Wiring, fuel temperature sensor
00540	–	Knock sensor (KS) 2	Wiring, KS, ECM
00542	–	Injector needle lift sensor	Air in fuel system, fuel level low, wiring, injector needle lift sensor
00543	–	Maximum engine RPM exceeded	Incorrect gear shift, CKP/RPM sensor, AT fault, ECM
00544	–	Maximum boost pressure exceeded	Hoses interchanged/not connected, hoses blocked/leaking, TC wastegate actuator/regulating valve, MAP sensor



## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
00545	–	ECM/TCM electrical connection	TCM trouble code(s) stored, wiring, transmission fault
00546	–	Data link connector (DLC) – defective	Wiring
00549	–	Instrument panel, fuel consumption signal	Wiring short to positive, instrument panel
00550	–	Start of injection – control	Wiring, fuel injection timing solenoid, injector needle lift sensor, air in fuel system, fuel level low, pump timing
00552	–	Volume air flow (VAF) sensor	Intake leak, wiring, VAF sensor
00553	–	Mass air flow (MAF) sensor	Intake leak, wiring, MAF sensor
00554	–	Heated oxygen sensor (HO2S) – lambda control	CO adjustment, heating inoperative, intake/exhaust leak, misfire, fuel level low, fuel pressure/pump, injector(s), EVAP canister purge valve, MAP sensor, MAF sensor filament burn-off, wiring, HO2S
00555	–	Heated oxygen sensor (HO2S) 2 – implausible signal	Wiring, HO2S, heating inoperative, fuel level low
00557	–	Power steering pressure (PSP) switch – short to earth	Wiring short to earth, PSP switch
00560	–	Exhaust gas recirculation (EGR) – control difference	Intake leak, EGR valve/solenoid
00561	–	Mixture control (MC)	Trouble codes 00525/00533 stored, fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, MAP sensor, MAF sensor filament burn-off, HO2S, EVAP canister purge valve, injector(s), excessive fuel in engine oil
00575	–	Intake manifold pressure	Intake leak/blockage, MAF sensor, MAP sensor, TC wastegate actuator/regulating valve, hoses interchanged/not connected, wiring
00577	–	Knock control, cylinder 1 – control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00578	–	Knock control, cylinder 2 – control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00579	–	Knock control, cylinder 3 – control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00580	–	Knock control, cylinder 4 – control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00581	–	Knock control, cylinder 5 – control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00582	–	Knock control, cylinder 6 – control limit exceeded	Fuel pressure, misfire, intake leak, injector(s)
00585	–	Exhaust gas recirculation temperature (EGRT) sensor	Wiring, EGRT sensor
00586	–	Exhaust gas recirculation (EGR) system – control	EGR solenoid
00609	–	Ignition amplifier, primary circuit 1	Wiring, ignition amplifier
00610	–	Ignition amplifier, primary circuit 2	Wiring, ignition amplifier
00611	–	Ignition amplifier, primary circuit 3	Wiring, ignition amplifier
00624	–	AC signal – compressor cut-in	Wiring, AC system
00625	–	Vehicle speed signal	Wiring, speedometer, VSS



VAG type 5-digit	EOBD type	Fault location	Probable cause
00626	–	Glow plug warning lamp	Wiring, glow plug warning lamp
00627	–	Fuel filter water level sensor	Water in filter, wiring, fuel filter water level sensor
00628	–	Fuel injection pump control module – engine stop malfunction	Wiring, fuel injection pump
00635	–	Heated oxygen sensor (HO2S) 1, bank 1 – heater circuit malfunction	Wiring, HO2S
00638	–	ECM/TCM electrical connection	Wiring, transmission fault
00640	–	Oxygen sensor heater relay	Wiring, oxygen sensor heater relay
00650	–	Clutch pedal position (CPP) switch – short to positive	Wiring short to positive, CPP switch
00653	–	Transmission control module (TCM)/TR sensor – implausible TR signal	Wiring, transmission fault, poor connection
00667	–	Outside air temperature signal	Wiring, instrument panel, AC system, outside air temperature sensor
00668	–	Engine control module (ECM) – supply voltage low	Battery, wiring, engine control relay
00670	–	Idle speed control (ISC) actuator position sensor	Wiring, throttle valve, ISC actuator position sensor
00671	–	Cruise control master switch	Wiring, cruise control master switch
00740	–	Camshaft position (CMP) sensor	Wiring, CMP sensor
00741	–	Stop lamp switch/brake pedal position (BPP) switch – implausible ratio	Wiring, both switch positions not synchronised, stop lamp switch, BPP switch
00750	–	Malfunction indicator lamp (MIL) – circuit malfunction	ECM incorrectly coded, wiring, MIL
00758	–	Secondary air injection (AIR) system	AIR solenoid/relay, wiring
00765	–	Fuel quantity adjuster position sensor	Wiring, fuel injection pump
00777	–	Accelerator pedal position (APP) sensor	Incorrectly adjusted, wiring, APP sensor
00792	–	AC pressure switch	Wiring, AC pressure switch
01013	–	AC compressor clutch, load signal	Wiring, AC system
01025	–	Malfunction indicator lamp (MIL)	Wiring, MIL
01028	–	Engine coolant blower motor relay	Wiring, engine coolant blower motor relay
01044	–	Engine control module (ECM) – coding	Incorrectly coded
01050	–	Glow plug monitoring	Fuse, wiring, glow plug relay, glow plugs
01052	–	Fuel lever position sensor	Wiring, fuel lever position sensor
01087	–	Engine control module (ECM) – basic setting	Basic setting not completed, throttle valve tight/sticking
01088	–	Mixture control (MC)	Fuel level low, fuel pressure/pump, MAP sensor, MAF sensor, intake/exhaust leak, EVAP canister purge valve, excessive fuel in engine oil, injector(s)
01117	–	Alternator load signal	Wiring, alternator
01119	–	Gear recognition signal – AT	Wiring
01120	–	Camshaft position (CMP) control, bank 1 – mechanical fault	Wiring, fuse, CMP actuator
01121	–	Camshaft position (CMP) control, bank 2 – mechanical fault	Wiring, fuse, CMP actuator






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## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
01126	–	Engine RPM signal	Wiring, CKP/RPM sensor, instrument panel
01163	–	Backfire	Intake leak, wiring, ignition amplifier, injector(s)
01165	–	Idle speed control (ISC) actuator/throttle motor	Accelerator cable adjustment, throttle valve, wiring, ISC actuator/throttle motor, basic setting not carried out
01167	–	Full throttle stop solenoid	Wiring, full throttle stop valve
01168	–	Idle speed boost solenoid	Wiring, full throttle stop valve, idle speed boost solenoid
01169	–	Door contact switch, driver's	Wiring, door contact switch
01170	–	Fuel injection timing sensor	Wiring, fuel injection timing sensor
01177	–	Engine control module (ECM) – defective	ECM
01180	–	Engine/AC electrical connection	Wiring
01182 	–	Mass air flow (MAF) sensor/throttle position (TP) sensor – signal incompatibility	Throttle valve sticking, ISC actuator/throttle motor sticking/mechanically damaged, incorrect throttle control unit, intake leak between MAF sensor and throttle valve, air filter blocked
01183	–	Malfunction indicator lamp (MIL) – circuit malfunction	ECM incorrectly coded, wiring, MIL
01193	–	Engine coolant heater relay 1, low output	Wiring, engine coolant heater relay
01194	–	Engine coolant heater relay 2, high output	Wiring, engine coolant heater relay
01196	–	CAN data bus, TCM – incorrect signal	Wiring
01204	–	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
01208	–	Engine control module (ECM) – data changed	ECM
01209	–	Alternator speed signal	Wiring, alternator
01235	–	Secondary air injection (AIR) solenoid	Wiring, AIR solenoid
01237	–	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid
01242	–	Engine control module (ECM) – output stages	Wiring, ECM controlled components
01243	–	Intake manifold air control solenoid	Wiring, intake manifold air control solenoid
01247	–	Evaporative emission (EVAP) canister purge valve	Wiring, fuse, EVAP canister purge valve
01249	–	Injector 1	Wiring, fuse, injector
01250	–	Injector 2	Wiring, fuse, injector
01251	–	Injector 3	Wiring, fuse, injector
01252	–	Injector 4	Wiring, fuse, injector
01253	–	Injector 5	Wiring, injector
01254	–	Injector 6	Wiring, injector
01257	–	Idle air control (IAC) valve	Wiring, IAC valve
01259	–	Fuel pump relay	Wiring, fuse, fuel pump relay
01262	–	Turbocharger (TC) wastegate regulating valve	Wiring, fuse, TC wastegate regulating valve
01265	–	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid
01266	–	Glow plug relay	Wiring, glow plug relay

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Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
01268	–	Fuel quantity adjuster	Incorrectly set, wiring, fuel injection pump
01269	–	Fuel injection timing solenoid	Wiring, fuel injection timing solenoid
01282	–	Intake manifold air control solenoid	Wiring, intake manifold air control solenoid
01283	–	Intake manifold air control actuator	Wiring, intake manifold flap, intake manifold air control actuator
01312	–	CAN data bus – defective	Trouble code(s) stored in other system(s), wiring
01314	–	Engine control module (ECM), cruise control system – defective	ECM
01315	–	CAN data bus, TCM – no signal	TCM trouble code(s) stored, wiring, matching resistor in ECM
01316	–	CAN data bus, ABS – defective	ABS control module incorrectly coded, wiring
01317	–	CAN data bus, instrumentation	Trouble code(s) stored in other system(s), wiring, instrumentation control module
01318	–	Fuel injection pump control module	Data bus wiring, fuel injection pump
01321	–	CAN data bus, SRS	SRS control module trouble code(s) stored, wiring
01375	–	Engine mounting control solenoid, bank 1 & 2	Wiring, engine mounting control solenoid
01376	–	Fuel injection pump position sensor	Wiring, fuel injection pump position sensor
01437	–	Throttle control unit – basic setting	Basic setting not carried out, CTP switch, ISC actuator/position sensor, TP sensor
01440	–	Fuel level signal	Wiring, instrument panel, fuel gauge tank sensor
01441	–	Fuel low level sensor	Wiring, fuel transfer pump, fuel level sensor
01442	–	Engine misfire – fuel pump housing empty	Fuel level low, fuel transfer pump
01575	–	Auxiliary drive – switched OFF	Auxiliary drive overloaded
01613	–	Fuel cooling pump relay – circuit malfunction	Wiring, fuel cooling pump relay
01656	–	SRS control module – crash signal	Wiring
01686	–	Engine coolant blower motor run-on relay	Wiring, engine coolant blower motor run-on relay
01695	–	Fuel temperature sensor – circuit malfunction	Wiring, fuel temperature sensor
16394	–	Camshaft position (CMP) actuator, intake/left/front, bank 1 – circuit malfunction	Wiring, CMP actuator
16395	–	Camshaft position (CMP), intake/left/front, bank 1 – timing over advanced/system performance	Valve timing, camshaft position (CMP) actuator
16396	–	Camshaft position (CMP), intake/left/front, bank 1 – timing over retarded	Valve timing, camshaft position (CMP) actuator
16398	–	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 – timing over advanced/system performance	Valve timing, camshaft position (CMP) actuator
16399	–	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 – timing over retarded	Valve timing, camshaft position (CMP) actuator
16414	–	Heated oxygen sensor (HO2S) 1, bank 1, heater control – circuit malfunction	Wiring open circuit, HO2S
16415	–	Heated oxygen sensor (HO2S) 1, bank 1, heater control – circuit low	Wiring short to earth, HO2S
16416	–	Heated oxygen sensor (HO2S) 1, bank 1, heater control – circuit high	Wiring short to positive, HO2S





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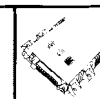
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## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
16474	–	Fuel metering solenoid – open circuit	Wiring open circuit, fuel metering solenoid
16475	–	Fuel metering solenoid – short to earth	Wiring short to earth, fuel metering solenoid
16476	–	Fuel metering solenoid – short to positive	Wiring short to positive, fuel metering solenoid
16485	–	Mass air flow (MAF) sensor, bank 1 – range/performance problem	Intake leak, wiring, MAF sensor
16486	–	Mass air flow (MAF) sensor, bank 1 – low input	Intake leak, air filter blocked, wiring short to earth, fuse, MAF sensor
16487	–	Mass air flow (MAF) sensor, bank 1 – high input	Wiring short to positive, earth wire defective, MAF sensor
16490	–	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor – range/performance problem	Intake/exhaust leak, wiring, MAP sensor, BARO sensor
16491	–	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor – low input	Wiring short to earth, MAP sensor, BARO sensor
16492	–	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor – high input	Wiring short to positive, MAP sensor, BARO sensor
16496	–	Intake air temperature (IAT) sensor – low input	Wiring short to earth, IAT sensor
16497	–	Intake air temperature (IAT) sensor – high input	Wiring open circuit/short to positive, earth wire defective, IAT sensor
16500	–	Engine coolant temperature (ECT) sensor – range/performance problem	Coolant thermostat, poor connection, wiring, ECT sensor
16501	–	Engine coolant temperature (ECT) sensor – low input	Coolant thermostat, wiring short to earth, ECT sensor
16502	–	Engine coolant temperature (ECT) sensor – high input	Coolant thermostat, wiring open circuit/short to positive, earth wire defective, ECT sensor
16504	–	Throttle position (TP) sensor – circuit malfunction	Poor connection, wiring, TP sensor
16505	–	Throttle position (TP) sensor – range/performance problem	Poor connection, TP sensor
16506	–	Throttle position (TP) sensor – low input	Signal wire short to earth, supply wire defective, TP sensor
16507	–	Throttle position (TP) sensor – high input	Signal wire open circuit/short to positive, earth wire defective, TP sensor
16514	–	Heated oxygen sensor (HO2S) 1, bank 1 – circuit malfunction	Heating inoperative, poor connection, wiring, HO2S
16515	–	Heated oxygen sensor (HO2S) 1, bank 1 – voltage low	Wiring short to earth, HO2S
16516	–	Heated oxygen sensor (HO2S) 1, bank 1 – voltage high	Wiring short to positive, HO2S
16517	–	Heated oxygen sensor (HO2S) 1, bank 1 – slow response	Heating inoperative, wiring, HO2S
16518	–	Heated oxygen sensor (HO2S) 1, bank 1 – no activity detected	Wiring open circuit, heating inoperative, HO2S
16519	–	Heated oxygen sensor (HO2S) 1, bank 1 – heater circuit malfunction	Fuse, wiring, HO2S
16520	–	Heated oxygen sensor (HO2S) 2, bank 1 – circuit malfunction	Heating inoperative, wiring, HO2S

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VAG type 5-digit	EOBD type	Fault location	Probable cause
16521	–	Heated oxygen sensor (HO2S) 2, bank 1 – low voltage	Wiring short to earth, exhaust leak, HO2S
16522	–	Heated oxygen sensor (HO2S) 2, bank 1 – high voltage	Wiring short to positive, HO2S
16523	–	Heated oxygen sensor (HO2S) 2, bank 1 – slow response	Heating inoperative, wiring, HO2S
16524	–	Heated oxygen sensor (HO2S) 2, bank 1 – no activity detected	Wiring, HO2S
16525	–	Heated oxygen sensor (HO2S) 2, bank 1 – heater circuit malfunction	Wiring, HO2S
16534	–	Heated oxygen sensor (HO2S) 1, bank 2 – circuit malfunction	Wiring, HO2S
16535	–	Heated oxygen sensor (HO2S) 1, bank 2 – low voltage	Wiring short to earth, HO2S
16536	–	Heated oxygen sensor (HO2S) 1, bank 2 – high voltage	Wiring short to positive, HO2S
16537	–	Heated oxygen sensor (HO2S) 1, bank 2 – slow response	Heating inoperative, wiring, HO2S
16538	–	Heated oxygen sensor (HO2S) 1, bank 2 – no activity detected	Wiring, HO2S
16540	–	Heated oxygen sensor (HO2S) 2, bank 2 – circuit malfunction	Heating inoperative, wiring, HO2S
16541	–	Heated oxygen sensor (HO2S) 2, bank 2 – low voltage	Wiring short to earth, exhaust leak, HO2S
16542	–	Heated oxygen sensor (HO2S) 2, bank 2 – high voltage	Wiring short to positive, HO2S
16543	–	Heated oxygen sensor (HO2S) 2, bank 2 – slow response	Heating inoperative, wiring, HO2S
16544	–	Heated oxygen sensor (HO2S) 2, bank 2 – no activity detected	Wiring, HO2S
16545	–	Heated oxygen sensor (HO2S) 2, bank 2 – heater circuit malfunction	Wiring, HO2S
16554	–	Fuel trim (FT), bank 1 – malfunction	Intake leak, AIR system, fuel pressure/pump, injector(s), EVAP canister purge valve, HO2S
16555	–	System too lean, bank 1	Intake/exhaust leak, AIR system, MAP sensor, MAF sensor, fuel pressure/pump, injector(s), EVAP canister purge valve, HO2S
16556	–	System too rich, bank 1	EVAP canister purge valve, fuel pressure, injector(s), HO2S
16557	–	Fuel trim (FT), bank 2 – malfunction	Fuel pressure/pump, injector(s), AIR system, hose connection(s), intake leak
16558	–	System too lean, bank 2	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose connection(s)
16559	–	System too rich, bank 2	Fuel pressure, injector(s), EVAP canister purge valve
16575	–	Fuel rail pressure (FRP) sensor – range/performance problem	Wiring, FRP sensor
16576	–	Fuel rail pressure (FRP) sensor – low input	Wiring short to earth, FRP sensor
16577	–	Fuel rail pressure (FRP) sensor – high input	Wiring short to positive, FRP sensor

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**Engine management**

<b>VAG type 5-digit</b>	<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
16578	–	Fuel rail pressure (FRP) sensor – circuit intermittent	Wiring open circuit, FRP sensor
16581	–	Engine oil temperature (EOT) sensor – low input	Wiring short to earth, EOT sensor
16582	–	Engine oil temperature (EOT) sensor – high input	Wiring short to positive, EOT sensor
16585	–	Injector 1 – circuit malfunction	Wiring, injector
16586	–	Injector 2 – circuit malfunction	Wiring, injector
16587	–	Injector 3 – circuit malfunction	Wiring, injector
16588	–	Injector 4 – circuit malfunction	Wiring, injector
16589	–	Injector 5 – circuit malfunction	Wiring, injector
16590	–	Injector 6 – circuit malfunction	Wiring, injector
16603	–	Engine over speed condition	Incorrect gear change
16605	–	Throttle position (TP) sensor B – range/performance problem	Wiring, TP sensor
16606	–	Throttle position (TP) sensor B – low input	Wiring short to earth, TP sensor
16607	–	Throttle position (TP) sensor B – high input	Wiring short to positive, TP sensor
16610	–	Accelerator pedal position (APP) sensor A/B – range/performance problem	Wiring, APP sensor
16611	–	Accelerator pedal position (APP) sensor A – low input	Wiring short to earth, APP sensor
16612	–	Accelerator pedal position (APP) sensor A – high input	Wiring short to positive, APP sensor
16614	–	Fuel pump relay – circuit malfunction	Wiring, fuel pump relay
16618	–	Engine boost condition – limit exceeded	Hose connection(s), wiring, TC wastegate regulating valve, TC wastegate
16619	–	Engine boost condition – limit not reached	Hose connection(s), wiring, TC wastegate regulating valve, TC wastegate
16620	–	Manifold absolute pressure (MAP) sensor A, TC system – range/performance problem	Intake/exhaust leak, hose connection(s), MAP sensor
16621	–	Manifold absolute pressure (MAP) sensor A, TC system – low input	Wiring short to earth, MAP sensor
16622	–	Manifold absolute pressure (MAP) sensor A, TC system – high input	Wiring short to positive, MAP sensor
16627	–	Turbocharger (TC) wastegate regulating valve A – circuit malfunction	Wiring, TC wastegate regulating valve
16629	–	Turbocharger (TC) wastegate regulating valve A – circuit low	Wiring short to earth, TC wastegate regulating valve
16630	–	Turbocharger (TC) wastegate regulating valve A – circuit high	Wiring short to positive, TC wastegate regulating valve
16645	–	Injector 1 – circuit low	Wiring short to earth, injector
16646	–	Injector 1 – circuit high	Wiring short to positive, injector
16648	–	Injector 2 – circuit low	Wiring short to earth, injector
16649	–	Injector 2 – circuit high	Wiring short to positive, injector
16651	–	Injector 3 – circuit low	Wiring short to earth, injector
16652	–	Injector 3 – circuit high	Wiring short to positive, injector



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Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
16654	–	Injector 4 – circuit low	Wiring short to earth, injector
16655	–	Injector 4 – circuit high	Wiring short to positive, injector
16657	–	Injector 5 – circuit low	Wiring short to earth, injector
16658	–	Injector 5 – circuit high	Wiring short to positive, injector
16660	–	Injector 6 – circuit low	Wiring short to earth, injector
16661	–	Injector 6 – circuit high	Wiring short to positive, injector
16684	–	Random/multiple cylinder(s) – misfire detected	Spark plug(s), HT lead(s), injector(s), ignition coil(s), low compression, wiring
16685	–	Cylinder 1 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16686	–	Cylinder 2 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16687	–	Cylinder 3 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16688	–	Cylinder 4 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16689	–	Cylinder 5 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16690	–	Cylinder 6 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16691	–	Cylinder 7 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16692	–	Cylinder 8 – misfire detected	Spark plug, HT lead(s), injector, ignition coil, low compression, wiring
16705	–	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – range/performance problem	Air gap, metal particles, insecure sensor/rotor, wiring, CKP/RPM sensor
16706	–	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal	Wiring, CKP/RPM sensor
16709	–	Knock sensor (KS) 1, bank 1 – circuit malfunction	Wiring, poor connection, KS
16710	–	Knock sensor (KS) 1, bank 1 – range/performance problem	Wiring, KS incorrectly tightened, KS
16711	–	Knock sensor (KS) 1, bank 1 – low input	Insecure KS, poor connection, wiring short to earth, incorrectly tightened, KS
16712	–	Knock sensor (KS) 1, bank 1 – high input	Wiring short to positive, KS incorrectly tightened, KS
16716	–	Knock sensor (KS) 2, bank 2 – low input	Insecure KS, poor connection, wiring short to earth, KS incorrectly tightened, KS
16717	–	Knock sensor (KS) 2, bank 2 – high input	Wiring short to positive, KS incorrectly tightened, KS
16719	–	Crankshaft position (CKP) sensor – circuit malfunction	Wiring, CKP/RPM sensor
16721	–	Crankshaft position (CKP) sensor – low input	Insecure sensor, air gap, wiring short to earth, CKP/RPM sensor
16724	–	Camshaft position (CMP) sensor A, bank 1 – circuit malfunction	Wiring, CMP sensor
16725	–	Camshaft position (CMP) sensor A, bank 1 – range/performance problem	Insecure sensor/rotor, air gap, wiring, CMP sensor

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**Engine management**

VAG type 5-digit	EOBD type	Fault location	Probable cause
16726	–	Camshaft position (CMP) sensor A, bank 1 – low input	Wiring short to earth, CMP sensor
16727	–	Camshaft position (CMP) sensor A, bank 1 – high input	Wiring short to positive, CMP sensor
16730	–	Camshaft position (CMP) sensor A, bank 2 – range/performance problem	Insecure sensor/rotor, air gap, wiring, CMP sensor
16731	–	Camshaft position (CMP) sensor A, bank 2 – low input	Wiring short to earth, CMP sensor
16732	–	Camshaft position (CMP) sensor A, bank 2 – high input	Wiring short to positive, CMP sensor
16735	–	Ignition coil, cylinder 1, primary/secondary – circuit malfunction	Wiring, ignition amplifier, ignition coil
16736	–	Ignition coil, cylinder 2, primary/secondary – circuit malfunction	Wiring, ignition amplifier, ignition coil
16737	–	Ignition coil, cylinder 3, primary/secondary – circuit malfunction	Wiring, ignition amplifier, ignition coil
16738	–	Ignition coil, cylinder 4, primary/secondary – circuit malfunction	Wiring, ignition amplifier, ignition coil
16764	–	Glow plugs – circuit A malfunction	Wiring, glow plug relay, fuse, glow plugs
16784	–	Exhaust gas recirculation (EGR) system – flow malfunction	Basic setting not carried out, EGR valve/solenoid
16785	–	Exhaust gas recirculation (EGR) system – insufficient flow detected	Hose leak/blockage, basic setting not carried out, EGR valve/solenoid
16786	–	Exhaust gas recirculation (EGR) system – excessive flow detected	EGR valve/solenoid, basic setting not carried out
16787	–	Exhaust gas recirculation (EGR) system – circuit malfunction	Wiring, EGR valve/solenoid
16788	–	Exhaust gas recirculation (EGR) system – range/performance problem	Hose connection(s), wiring, EGR valve/solenoid
16791	–	Exhaust gas recirculation (EGR) valve position sensor – low input	Wiring short to earth, EGR valve position sensor
16792	–	Exhaust gas recirculation (EGR) valve position sensor – high input	Wiring short to positive, EGR valve position sensor
16795	–	Secondary air injection (AIR) system – incorrect flow detected	AIR pump, AIR valve, AIR hose(s)
16796	–	Secondary air injection (AIR) solenoid A – circuit malfunction	Wiring, AIR solenoid
16802	–	Secondary air injection (AIR) pump relay A – circuit malfunction	Wiring, AIR pump relay
16804	–	Catalytic converter system, bank 1 – efficiency below threshold	Catalytic converter
16806	–	Main catalytic converter, bank 1 – efficiency below threshold	Catalytic converter
16814	–	Catalytic converter system, bank 2 – efficiency below threshold	Catalytic converter
16824	–	Evaporative emission (EVAP) system – malfunction	Hose connection(s), intake leak, EVAP canister purge valve
16825	–	Evaporative emission (EVAP) system – incorrect flow detected	Hose connection(s), intake leak, EVAP canister purge valve

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Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
16826	–	Evaporative emission (EVAP) system – small leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
16827	–	Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring, EVAP canister purge valve
16828	–	Evaporative emission (EVAP) canister purge valve – open circuit	Wiring open circuit, EVAP canister purge valve
16829	–	Evaporative emission (EVAP) canister purge valve – short circuit	Wiring short circuit, EVAP canister purge valve
16839	–	Evaporative emission (EVAP) system – large leak detected	Hose connection(s), intake leak, EVAP canister, EVAP canister purge valve
16845	–	Fuel tank level sensor – range/performance problem	Wiring, fuel tank level sensor
16864	–	Engine coolant blower motor 1 – circuit malfunction	Wiring, engine coolant blower motor
16865	–	Engine coolant blower motor 2 – circuit malfunction	Wiring, engine coolant blower motor
16885	–	Vehicle speed sensor (VSS) – range/performance problem	Wiring, speedometer, VSS, CAN data bus
16887	–	Vehicle speed sensor (VSS) – intermittent/erratic/high input	Wiring, other connected system, instrument panel, VSS
16890	–	Idle speed control (ISC) system – rpm lower than expected	Throttle control unit
16891	–	Idle speed control (ISC) system – rpm higher than expected	Throttle control unit
16894	–	Closed throttle position (CTP) switch – circuit malfunction	Wiring, CTP switch
16916	–	AC refrigerant pressure sensor – low input	AC refrigerant pressure too low (incorrectly charged), wiring, AC refrigerant pressure sensor
16917	–	AC refrigerant pressure sensor – high input	AC refrigerant pressure too high (cooling fault/incorrectly charged), wiring, AC refrigerant pressure sensor
16928	–	Exhaust gas recirculation temperature (EGRT) sensor, bank 1 – circuit malfunction	Wiring, EGRT sensor
16929	–	Exhaust gas recirculation temperature (EGRT) sensor, bank 1 – low input	Wiring short to earth, EGRT sensor
16930	–	Exhaust gas recirculation temperature (EGRT) sensor, bank 1 – high input	Wiring short to positive, EGRT sensor
16935	–	Power steering pressure (PSP) sensor/switch – range/performance problem	Wiring, PSP switch
16944	–	System voltage – malfunction	Fuse(s), battery, wiring, engine control relay
16946	–	System voltage – low	Fuse(s), battery, wiring, engine control relay
16947	–	System voltage – high	Alternator, wiring
16952	–	Cruise control master/selector switch, SET signal – malfunction	Wiring, cruise control master/selector switch
16955	–	Stop lamp switch/brake pedal position (BPP) switch – circuit malfunction	Wiring, stop lamp switch, BPP switch
16983	–	CAN data bus – malfunction	Trouble code(s) stored in other system, wiring
16984	–	CAN data bus – malfunction	Trouble code(s) stored in other system, wiring

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**Engine management**

<b>VAG type 5-digit</b>	<b>EOBD type</b>	<b>Fault location</b>	<b>Probable cause</b>
16985	–	Engine control module (ECM) – memory check sum error	ECM
16987	–	Engine control module (ECM) – KAM error	ECM
16988	–	Engine control module (ECM) – RAM error	ECM
16989	–	Engine control module (ECM) – ROM error	ECM
16990	–	Engine control module (ECM) – PCM processor fault	ECM
17022 <b>3</b>	–	Throttle actuator control, bank 1 – range/performance problem	Basic setting not carried out, throttle control unit, APP sensor
17026	–	Engine control module (ECM), knock control – defective	ECM
17029	–	Air conditioning	Wiring, AC system
17034	–	Malfunction indicator lamp (MIL) – circuit malfunction	Wiring, MIL
17040	–	Instrument panel, fuel consumption signal – circuit malfunction	Wiring
17071	–	Engine control relay – short to earth	Wiring short to earth, engine control relay
17072	–	Engine control relay – short to positive	Wiring short to positive, engine control relay
17075	–	Engine coolant blower motor 1 – short to earth	Wiring short to earth, engine coolant blower motor
17076	–	Engine coolant blower motor 1 – short to positive	Wiring short to positive, engine coolant blower motor
17077	–	Engine coolant blower motor 2 – short to earth	Wiring short to earth, engine coolant blower motor
17078	–	Engine coolant blower motor 2 – short to positive	Wiring short to positive, engine coolant blower motor
17091	–	Transmission range (TR) sensor – low input	Wiring short to earth, TR sensor
17092	–	Transmission range (TR) sensor – high input	Wiring short to positive, TR sensor
–	<b>P0</b>	Refer to EOBD trouble code table	–
17428	<b>P1020</b>	Fuel pressure – control limit exceeded	Wiring, fuel pressure sensor, fuel pressure control valve, high pressure fuel pump
17431	<b>P1023</b>	Fuel pressure control valve – short to earth	Wiring short to earth, fuel pressure control valve
17432	<b>P1024</b>	Fuel pressure control valve – open circuit	Wiring open circuit, fuel pressure control valve
17433	<b>P1025</b>	Fuel pressure control valve – mechanical fault	Fuel pressure control valve
17434	<b>P1026</b>	Intake manifold air control solenoid – short to positive	Wiring short to positive, intake manifold air control solenoid
17435	<b>P1027</b>	Intake manifold air control solenoid – short to earth	Wiring short to earth, intake manifold air control solenoid
17436	<b>P1028</b>	Intake manifold air control solenoid – open circuit	Wiring open circuit, intake manifold air control solenoid
17437	<b>P1029</b>	Intake manifold air control valve position sensor – upper limit not reached	Air control flap tight/sticking, hose connection(s), intake manifold air control actuator
17438	<b>P1030</b>	Intake manifold air control valve position sensor – lower limit not reached	Air control flap tight/sticking, hose connection(s), intake manifold air control actuator
17439	<b>P1031</b>	Intake manifold air control valve position sensor – specification not attained	Air control flap tight/sticking, hose connection(s), intake manifold air control actuator, intake manifold air control solenoid



VAG type 5-digit	EOBD type	Fault location	Probable cause
17440 <b>6</b>	P1032	Nitrogen oxides (NOx) sensor – signal too high	Catalytic converter, wiring short to positive, NOx sensor
17441 <b>6</b>	P1033	Nitrogen oxides (NOx) sensor – signal too low	Exhaust leak, wiring short to earth, NOx sensor
17442 <b>6</b>	P1034	Nitrogen oxides (NOx) sensor – signal outside tolerance	Catalytic converter, exhaust leak, wiring, NOx sensor
17443 <b>6</b>	P1035	Nitrogen oxides (NOx) sensor – range/performance problem	Wiring, heating inoperative, NOx sensor
17444 <b>6</b>	P1036	Nitrogen oxides (NOx) heater sensor – short to positive	Wiring short to positive, NOx sensor
17445 <b>6</b>	P1037	Nitrogen oxides (NOx) heater sensor – short to earth	Wiring short to earth, NOx sensor
17446 <b>6</b>	P1038	Nitrogen oxides (NOx) heater sensor – open circuit	Wiring open circuit, NOx sensor
17447	P1039	Injector 1, supply voltage – short circuit	Wiring, injector
17448	P1040	Injector 1, supply voltage – circuit malfunction	Wiring, injector
17449	P1041	Injector 2, supply voltage – short circuit	Wiring, injector
17450	P1042	Injector 2, supply voltage – circuit malfunction	Wiring, injector
17451	P1043	Injector 3, supply voltage – short circuit	Wiring, injector
17452	P1044	Injector 3, supply voltage – circuit malfunction	Wiring, injector
17453	P1045	Injector 4, supply voltage – short circuit	Wiring, injector
17454	P1046	Injector 4, supply voltage – circuit malfunction	Wiring, injector
17455	P1047	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 – circuit malfunction	Wiring, camshaft position (CMP) actuator
17456	P1048	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 – short to positive	Wiring short to positive, camshaft position (CMP) actuator
17457	P1049	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 – short to earth	Wiring short to earth, camshaft position (CMP) actuator
17458	P1050	Camshaft position (CMP) actuator, exhaust/right/rear, bank 1 – open circuit	Wiring open circuit, camshaft position (CMP) actuator
17471	P1063	Fuel pressure – control limit not reached	Air in fuel system, fuel leak, fuel lift pump, fuel bypass valve, fuel pressure control valve, high pressure fuel pump
17472	P1064	Fuel pressure – mechanical fault	Air in fuel system, fuel leak, fuel lift pump, fuel bypass valve, fuel pressure control valve, high pressure fuel pump
17473	P1065	Fuel pressure – system deviation	Air in fuel system, fuel leak, fuel lift pump, fuel bypass valve, fuel pressure control valve, high pressure fuel pump
17474	P1066	Intake manifold air control solenoid – short to positive	Wiring short to positive, intake manifold air control solenoid
17475	P1067	Intake manifold air control solenoid – short to earth	Wiring short to earth, intake manifold air control solenoid
17476	P1068	Intake manifold air control solenoid – open circuit	Wiring open circuit, intake manifold air control solenoid



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VAG type 5-digit	EOBD type	Fault location	Probable cause
17477 ■	P1069	Nitrogen oxides (NOx) sensor – heater control – short to earth	Wiring short to earth, NOx sensor
17478 ■	P1070	Nitrogen oxides (NOx) sensor – heater control – short to positive	Wiring short to positive, NOx sensor
17479 ■	P1071	Nitrogen oxides (NOx) sensor – heater control – incorrect signal	Wiring, NOx sensor
17480 ■	P1072	Nitrogen oxides (NOx) sensor – heater control – circuit malfunction	Wiring, NOx sensor
17501	P1093	Mixture control (MC), bank 1 – malfunction	Fuel pressure/pump, injector(s) intake leak
17509	P1101	Heated oxygen sensor (HO2S) 1, bank 1 – low voltage/air leak	Intake/exhaust leak, fuel pressure/pump, wiring short to earth, HO2S
17510	P1102	Heated oxygen sensor (HO2S) 1, bank 1 – heater short to positive	Wiring short to positive, HO2S
17511	P1103	Heated oxygen sensor (HO2S) 1, bank 1 – heater output too low	Wiring, HO2S
17513	P1105	Heated oxygen sensor (HO2S) 2, bank 1 – heater short to positive	Wiring short to positive, HO2S
17514	P1106	Heated oxygen sensor (HO2S) 1, bank 2 – low voltage/air leak	Intake/exhaust leak, fuel pressure/pump, wiring short to earth, HO2S
17515	P1107	Heated oxygen sensor (HO2S) 1, bank 2 – heater short to positive	Wiring short to positive, HO2S
17518	P1110	Heated oxygen sensor (HO2S) 2, bank 2 – heater short to positive	Wiring short to positive, HO2S
17519	P1111	Heated oxygen sensor (HO2S) control, bank 1 – system too lean	Intake/exhaust leak, injector blocked, MAP sensor, MAF sensor, fuel pressure/pump, HO2S
17520	P1112	Heated oxygen sensor (HO2S) control, bank 1 – system too rich	Excessive fuel in engine oil, injector leaking, fuel pressure, EVAP canister purge valve, MAP sensor, MAF sensor, HO2S
17521	P1113	Heated oxygen sensor (HO2S) 1, bank 1 – heater resistance too high	Wiring, HO2S
17522	P1114	Heated oxygen sensor (HO2S) 2, bank 1 – heater resistance too high	Wiring, HO2S
17523	P1115	Heated oxygen sensor (HO2S) 1, bank 1 – heater short to earth	Wiring short to earth, HO2S
17524	P1116	Heated oxygen sensor (HO2S) 1, bank 1 – heater open circuit	Wiring open circuit, HO2S
17525	P1117	Heated oxygen sensor (HO2S) 2, bank 1 – heater short to earth	Wiring short to earth, HO2S
17526	P1118	Heated oxygen sensor (HO2S) 2, bank 1 – heater open circuit	Wiring open circuit, HO2S
17527	P1119	Heated oxygen sensor (HO2S) 1, bank 2 – heater short to earth	Wiring short to earth, HO2S
17528	P1120	Heated oxygen sensor (HO2S) 1, bank 2 – heater open circuit	Wiring open circuit, HO2S
17529	P1121	Heated oxygen sensor (HO2S) 2, bank 2 – heater short to earth	Wiring short to earth, HO2S
17530	P1122	Heated oxygen sensor (HO2S) 2, bank 2 – heater open circuit	Wiring open circuit, HO2S
17535	P1127	Long term fuel trim, entire speed/load range, bank 1 – system too rich	Excessive fuel in engine oil, fuel pressure, EVAP canister purge valve, injector(s)



VAG type 5-digit	EOBD type	Fault location	Probable cause
17536	P1128	Long term fuel trim, entire speed/load range, bank 1 – system too lean	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose leak
17537	P1129	Long term fuel trim, entire speed/load range, bank 2 – system too rich	Excessive fuel in engine oil, fuel pressure, EVAP canister purge valve, injector(s)
17538	P1130	Long term fuel trim, entire speed/load range, bank 2 – system too lean	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose leak
17539	P1131	Heated oxygen sensor (HO2S) 1, bank 1 – heater resistance too high	Wiring, HO2S
17540	P1132	Heated oxygen sensor (HO2S) 1, bank 1 & 2 – heater control – circuit high	Wiring short to positive, HO2S
17541	P1133	Heated oxygen sensor (HO2S) 1, bank 1 & 2 – heater control – circuit low	Wiring open circuit/short to earth, HO2S
17544	P1136	Long term fuel trim, idling, bank 1 – system too lean	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose leak
17545	P1137	Long term fuel trim, idling, bank 1 – system too rich	Fuel pressure, injector(s), EVAP canister purge valve
17546	P1138	Long term fuel trim, idling, bank 2 – system too lean	Fuel pressure/pump, injector(s), intake/exhaust leak, AIR system, hose leak
17547	P1139	Long term fuel trim, idling, bank 2 – system too rich	Fuel pressure, injector(s), EVAP canister purge valve
17548	P1140	Heated oxygen sensor (HO2S) 2, bank 2 – heater resistance too high	Wiring, HO2S
17549	P1141	Load calculation – implausible value	Wiring, MAP sensor, MAF sensor
17550	P1142	Load calculation – too low	Throttle control unit, MAP sensor, MAF sensor, APP sensor
17551	P1143	Load calculation – too high	Throttle control unit, MAP sensor, MAF sensor, APP sensor
17552	P1144	Mass air flow (MAF) sensor, bank 1 – open circuit/short to earth	Wiring open circuit/short to earth, MAF sensor
17553	P1145	Mass air flow (MAF) sensor, bank 1 – short to positive	Wiring short to positive, MAF sensor
17554	P1146	Mass air flow (MAF) sensor, bank 1 – supply voltage	Operating voltage too high/low, wiring
17555	P1147	Heated oxygen sensor (HO2S) 1, bank 2 – lambda regulation, system too lean	Intake leak, wiring, HO2S
17556	P1148	Heated oxygen sensor (HO2S) 1, bank 2 – lambda regulation, system too rich	Exhaust leak, wiring, HO2S
17557	P1149	Heated oxygen sensor (HO2S) 1, bank 1 – implausible lambda control value	Exhaust leak, wiring, HO2S
17558	P1150	Heated oxygen sensor (HO2S) 1, bank 2 – implausible lambda control value	Exhaust leak, wiring, HO2S
17559	P1151	Long term fuel trim 1, bank 1 – below lean limit	Fuel pressure/pump, injectors, intake/exhaust leak, HO2S
17560	P1152	Long term fuel trim 2, bank 1 – below lean limit	Fuel pressure/pump, injectors, intake/exhaust leak, AIR system, HO2S
17561	P1153	Heated oxygen sensor (HO2S) 2, bank 1 & 2 – interchanged	HO2S 2 on bank 1 & 2 incorrectly installed
17563	P1155	Manifold absolute pressure (MAP) sensor – short to positive	Wiring short to positive, MAP sensor





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VAG type 5-digit	EOBD type	Fault location	Probable cause
17564	P1156	Manifold absolute pressure (MAP) sensor – open circuit/short to earth	Wiring open circuit/short to earth, MAP sensor
17565	P1157	Manifold absolute pressure (MAP) sensor – supply voltage	Wiring, MAP sensor
17566	P1158	Manifold absolute pressure (MAP) sensor – range/performance problem	Wiring, hose connection(s), MAP sensor
17567	P1159	Mass air flow (MAF) sensor, bank 1 & 2 – implausible ratio	EGR system, intake leak, wiring, MAF sensor 1/2
17568	P1160	Intake air temperature (IAT) sensor – short to earth	Wiring short to earth, IAT sensor
17569	P1161	Intake air temperature (IAT) sensor – open circuit/short to positive	Wiring open circuit/short to positive, IAT sensor
17570	P1162	Fuel temperature sensor – short to earth	Wiring short to earth, fuel temperature sensor
17571	P1163	Fuel temperature sensor – open circuit/short to positive	Wiring open circuit/short to positive, fuel temperature sensor
17572	P1164	Fuel temperature sensor – range/performance problem	Wiring, fuel temperature sensor
17573	P1165	Long term fuel trim 1, bank 1 – above rich limit	Fuel pressure/pump, injectors, EVAP canister purge valve, EGR system, HO2S, intake/exhaust system
17574	P1166	Long term fuel trim 2, bank 1 – above rich limit	Fuel pressure/pump, injectors, EVAP canister purge valve, EGR system, HO2S, intake/exhaust system
17575	P1167	Mass air flow (MAF) sensor, bank 2 – range/performance problem	Intake leak, wiring, MAF sensor
17576	P1168	Mass air flow (MAF) sensor, bank 2 – low input	Intake leak, air filter blocked, wiring short to earth, fuse, MAF sensor
17577	P1169	Mass air flow (MAF) sensor, bank 2 – high input	Wiring short to positive, earth wire defective, MAF sensor
17578	P1170	Mass air flow (MAF) sensor, bank 2 – supply voltage	Wiring, fuse, engine control relay, injector
17579	P1171	Throttle motor position sensor 2 – range/performance problem	Wiring, throttle valve tight/sticking, throttle motor position sensor
17580	P1172	Throttle motor position sensor 2 – low input	Wiring short to earth, throttle motor position sensor
17581	P1173	Throttle motor position sensor 2 – high input	Wiring short to positive, throttle motor position sensor
17582	P1174	Fuel measurement system, bank 1 – injection timing incorrect	Fuel pressure/pump, injector(s), intake/exhaust leak, EGR system, EVAP canister purge valve, HO2S
17584	P1176	Lambda correction after catalyst, bank 1 – control limit reached	Intake leak, HO2S
17585	P1177	Lambda correction after catalyst, bank 2 – control limit reached	Intake leak, HO2S
17586	P1178	Heated oxygen sensor (HO2S) 1, bank 1, pump current – open circuit	Wiring open circuit, HO2S
17587	P1179	Heated oxygen sensor (HO2S) 1, bank 1, pump current – short to earth	Wiring short to earth, HO2S
17588	P1180	Heated oxygen sensor (HO2S) 1, bank 1, pump current – short to positive	Wiring short to positive, HO2S



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Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
17589	P1181	Heated oxygen sensor (HO2S) 1, bank 1, reference voltage – open circuit	Wiring open circuit, HO2S, HT leads, spark plugs, misfire detection
17590	P1182	Heated oxygen sensor (HO2S) 1, bank 1, reference voltage – short to earth	Wiring short to earth, HO2S, HT leads, spark plugs, misfire detection
17591	P1183	Heated oxygen sensor (HO2S) 1, bank 1, reference voltage – short to positive	Wiring short to positive, HO2S, HT leads, spark plugs, misfire detection
17595	P1187	Heated oxygen sensor (HO2S) 1, bank 1 or 2 – circuit malfunction	Wiring, HO2S
17598	P1190	Heated oxygen sensor (HO2S) 1, bank 1, reference voltage – range/performance problem	Wiring, HO2S, HT leads, spark plugs, misfire detection
17599	P1191	Heated oxygen sensor (HO2S) 1, bank 1 & 2 – interchanged	HO2S 1 on banks 1 & 2 incorrectly installed
17600	P1192	Fuel pressure sensor – supply voltage	Wiring, fuel pressure sensor
17601	P1193	Fuel pressure sensor – open circuit/short to positive	Wiring open circuit/short to positive
17602	P1194	Fuel pressure control valve – short to positive	Wiring short to positive, fuel pressure control valve
17603	P1195	Fuel pressure control valve – open circuit/short to earth	Wiring open circuit/short to earth, fuel pressure control valve
17604	P1196	Heated oxygen sensor (HO2S) 1, bank 1, heater circuit malfunction	Wiring, HO2S
17605	P1197	Heated oxygen sensor (HO2S) 1, bank 2, heater circuit malfunction	Wiring, HO2S
17606	P1198	Heated oxygen sensor (HO2S) 2, bank 1, heater circuit malfunction	Wiring, HO2S
17607	P1199	Heated oxygen sensor (HO2S) 2, bank 2, heater circuit malfunction	Wiring, HO2S
17609	P1201	Injector 1 – circuit malfunction	Wiring, injector
17610	P1202	Injector 2 – circuit malfunction	Wiring, injector
17611	P1203	Injector 3 – circuit malfunction	Wiring, injector
17612	P1204	Injector 4 – circuit malfunction	Wiring, injector
17613	P1205	Injector 5 – circuit malfunction	Wiring, injector
17614	P1206	Injector 6 – circuit malfunction	Wiring, injector
17615	P1207	Injector 7 – circuit malfunction	Wiring, injector
17616	P1208	Injector 8 – circuit malfunction	Wiring, injector
17621	P1213	Injector 1 – short to positive	Wiring short to positive, injector
17622	P1214	Injector 2 – short to positive	Wiring short to positive, injector
17623	P1215	Injector 3 – short to positive	Wiring short to positive, injector
17624	P1216	Injector 4 – short to positive	Wiring short to positive, injector
17625	P1217	Injector 5 – short to positive	Wiring short to positive, injector
17626	P1218	Injector 6 – short to positive	Wiring short to positive, injector
17627	P1219	Injector 7 – short to positive	Wiring short to positive, injector
17628	P1220	Injector 8 – short to positive	Wiring short to positive, injector
17633	P1225	Injector 1 – short to earth	Wiring short to earth, injector
17634	P1226	Injector 2 – short to earth	Wiring short to earth, injector



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## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
17635	P1227	Injector 3 – short to earth	Wiring short to earth, injector
17636	P1228	Injector 4 – short to earth	Wiring short to earth, injector
17637	P1229	Injector 5 – short to earth	Wiring short to earth, injector
17638	P1230	Injector 6 – short to earth	Wiring short to earth, injector
17639	P1231	Injector 7 – short to earth	Wiring short to earth, injector
17640	P1232	Injector 8 – short to earth	Wiring short to earth, injector
17645	P1237	Injector 1 – open circuit	Wiring open circuit, injector
17646	P1238	Injector 2 – open circuit	Wiring open circuit, injector
17647	P1239	Injector 3 – open circuit	Wiring open circuit, injector
17648	P1240	Injector 4 – open circuit	Wiring open circuit, injector
17649	P1241	Injector 5 – open circuit	Wiring open circuit, injector
17650	P1242	Injector 6 – open circuit	Wiring open circuit, injector
17653	P1245	Injector needle lift sensor – short to earth	Wiring short to earth, injector needle lift sensor
17651	P1243	Injector 7 – open circuit	Wiring open circuit, injector
17652	P1244	Injector 8 – open circuit	Wiring open circuit, injector
17653	P1245	Injector needle lift sensor – short to earth	Wiring short to earth, injector needle lift sensor
17654	P1246	Injector needle lift sensor – range/performance problem	Injector needle lift sensor, injector pipe defective, fuel level low
17655	P1247	Injector needle lift sensor – open circuit/short to positive	Wiring open circuit/short to positive, injector needle lift sensor
17656	P1248	Start of injection – control difference	Fuel injection timing solenoid, injector needle lift sensor, fuel level low, pump timing
17658	P1250	Fuel tank level sensor – low input	Fuel level too low
17659	P1251	Fuel injection timing solenoid – short to positive	Wiring short to positive
17660	P1252	Fuel injection timing solenoid – open circuit/short to earth	Wiring open circuit/short to earth, fuel injection timing solenoid
17661	P1253	Instrument panel, fuel consumption signal – short to earth	Wiring short to earth, instrument panel
17662	P1254	Instrument panel, fuel consumption signal – short to positive	Wiring short to positive, instrument panel
17663	P1255	Engine coolant temperature (ECT) sensor – short to earth	Wiring short to earth, ECT sensor
17664	P1256	Engine coolant temperature (ECT) sensor – open circuit/short to positive	Wiring open circuit/short to positive, ECT sensor
17668	P1260	Injector 1 – implausible signal	No control
17669	P1261	Injector 1 – control limit exceeded	Control period too long, wiring, injector
17670	P1262	Injector 1 – control limit not reached	Control period too short, fuel level low, air in fuel system
17671	P1263	Injector 2 – implausible signal	No control
17672	P1264	Injector 2 – control limit exceeded	Control period too long, wiring, injector
17673	P1265	Injector 2 – control limit not reached	Control period too short, fuel level low, air in fuel system
17674	P1266	Injector 3 – implausible signal	No control
17675	P1267	Injector 3 – control limit exceeded	Control period too long, wiring, injector

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VAG type 5-digit	EOBD type	Fault location	Probable cause
17676	P1268	Injector 3 – control limit not reached	Control period too short, fuel level low, air in fuel system
17677	P1269	Injector 4 – implausible signal	No control
17678	P1270	Injector 4 – control limit exceeded	Control period too long, wiring, injector
17679	P1271	Injector 4 – control limit not reached	Control period too short, fuel level low, air in fuel system
17686	P1278	Fuel metering solenoid – short to positive	Wiring short to positive, fuel metering solenoid
17687	P1279	Fuel metering solenoid – open circuit/short to earth	Wiring open circuit/short to earth, fuel metering solenoid
17689	P1281	Fuel metering solenoid – short to earth	Wiring short to earth, fuel metering solenoid
17690	P1282	Fuel metering solenoid – open circuit	Wiring open circuit, fuel metering solenoid
17695	P1287	Turbocharger (TC) bypass valve – open circuit	Wiring open circuit, TC bypass valve
17696	P1288	Turbocharger (TC) bypass valve – short to positive	Wiring short to positive, TC bypass valve
17697	P1289	Turbocharger (TC) bypass valve – short to earth	Wiring short to earth, TC bypass valve
17698	P1290	Engine coolant temperature (ECT) sensor, ECM controlled cooling system – high input	Wiring, ECT sensor
17699	P1291	Engine coolant temperature (ECT) sensor, ECM controlled cooling system – high input	Wiring, ECT sensor
17700	P1292	Engine coolant thermostat – open circuit	Wiring open circuit, engine coolant thermostat
17701	P1293	Engine coolant thermostat – short to positive	Wiring short to positive, engine coolant thermostat
17702	P1294	Engine coolant thermostat – short to earth	Wiring short to earth, engine coolant thermostat
17703	P1295	Turbocharger (TC), bypass – flow malfunction	TC wastegate regulating valve, hose connection(s), injector
17704	P1296	Engine cooling system – malfunction	ECT sensor, coolant thermostat
17705	P1297	Turbocharger (TC)/throttle valve, hose connection – pressure loss	Hose connection
17707	P1299	Fuel metering solenoid – circuit malfunction	Wiring, fuel metering solenoid
17708	P1300	Random/multiple cylinder(s) – misfire detected	Fuel level low, fuel gauge tank sensor
17733	P1325	Knock control, cylinder 1 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17734	P1326	Knock control, cylinder 2 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17735	P1327	Knock control, cylinder 3 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17736	P1328	Knock control, cylinder 4 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17737	P1329	Knock control, cylinder 5 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection





## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
17738	P1330	Knock control, cylinder 6 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17739	P1331	Knock control, cylinder 7 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17740	P1332	Knock control, cylinder 8 – control limit reached	Poor quality fuel, incorrect fuel, insecure engine component, KS incorrectly tightened/defective, shield wiring open circuit, poor connection
17743 <b>3</b>	P1335	Engine torque control – limit reached	Throttle control unit, hose(s), TC system, MAP sensor, IAT sensor, MAF sensor, ECT sensor
17744 <b>3</b>	P1336	Engine torque monitoring – control limit exceeded	Hose(s), TC system, throttle control unit, IAT sensor, MAP sensor, MAF sensor, ECT sensor, APP sensor
17745	P1337	Camshaft position (CMP) sensor, bank 1 – short to earth	Wiring short to earth, CMP sensor
17746	P1338	Camshaft position (CMP) sensor, bank 1 – open circuit/short to positive	Wiring open circuit/short to positive, CMP sensor
17747	P1339	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – interchanged	Multi-plugs incorrectly connected
17748	P1340	Camshaft position (CMP) sensor 1/bank 1/ crankshaft position (CKP) sensor – out of sequence	Valve timing, CKP/CMP sensor installation, CKP sensor rotor
17749	P1341	Ignition amplifier, primary circuit 1 – short to earth	Wiring short to earth, ignition amplifier, CMP sensor, HT leads, spark plugs
17750	P1342	Ignition amplifier, primary circuit 1 – short to positive	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17751	P1343	Ignition amplifier, primary circuit 2 – short to earth	Wiring short to earth, ignition amplifier, CMP sensor, HT leads, spark plugs
17752	P1344	Ignition amplifier, primary circuit 2 – short to positive	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17753	P1345	Ignition amplifier, primary circuit 3 – short to earth	Wiring short to earth, ignition amplifier, CMP sensor, HT leads, spark plugs
17754	P1346	Ignition amplifier, primary circuit 3 – short to positive	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17755	P1347	Camshaft position (CMP) sensor 2/bank 2/ crankshaft position (CKP) sensor – out of sequence	Valve timing, CKP/CMP sensor installation, CKP sensor rotor
17756	P1348	Ignition amplifier, primary circuit 1 – open circuit	Wiring short to earth, ignition amplifier, CMP sensor, HT leads, spark plugs
17757	P1349	Ignition amplifier, primary circuit 2 – open circuit	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17758	P1350	Ignition amplifier, primary circuit 3 – open circuit	Wiring short to positive, ignition amplifier, CMP sensor, HT leads, spark plugs
17759	P1351	Camshaft position (CMP) sensor, bank 1 – range/performance problem	Ignore trouble code, erase fault memory
17762	P1354	Fuel quantity adjuster position sensor	Wiring, fuel injection pump
17763 <b>4</b>	P1355	Ignition coil/amplifier, cylinder 1 – open circuit	Wiring open circuit, ignition coil/amplifier
17764 <b>4</b>	P1356	Ignition coil/amplifier, cylinder 1 – short to positive	Wiring short to positive, ignition coil/amplifier

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VAG type 5-digit	EOBD type	Fault location	Probable cause
17765 ■	P1357	Ignition coil/amplifier, cylinder 1 – short to earth	Wiring short to earth, ignition coil/amplifier
17766 ■	P1358	Ignition coil/amplifier, cylinder 2 – open circuit	Wiring open circuit, ignition coil/amplifier
17767 ■	P1359	Ignition coil/amplifier, cylinder 2 – short to positive	Wiring short to positive, ignition coil/amplifier
17768 ■	P1360	Ignition coil/amplifier, cylinder 2 – short to earth	Wiring short to earth, ignition coil/amplifier
17769	P1361	Ignition coil/amplifier, cylinder 3 – open circuit	Wiring open circuit, ignition coil/amplifier
17770	P1362	Ignition coil/amplifier, cylinder 3 – short to positive	Wiring short to positive, ignition coil/amplifier
17771	P1363	Ignition coil/amplifier, cylinder 3 – short to earth	Wiring short to earth, ignition coil/amplifier
17772	P1364	Ignition coil/amplifier, cylinder 4 – open circuit	Wiring open circuit, ignition coil/amplifier
17773	P1365	Ignition coil/amplifier, cylinder 4 – short to positive	Wiring short to positive, ignition coil/amplifier
17774	P1366	Ignition coil/amplifier, cylinder 4 – short to earth	Wiring short to earth, ignition coil/amplifier
17775	P1367	Ignition coil/amplifier, cylinder 5 – open circuit	Wiring open circuit, ignition coil/amplifier
17776	P1368	Ignition coil/amplifier, cylinder 5 – short to positive	Wiring short to positive, ignition coil/amplifier
17777	P1369	Ignition coil/amplifier, cylinder 5 – short to earth	Wiring short to earth, ignition coil/amplifier
17778	P1370	Ignition coil/amplifier, cylinder 6 – open circuit	Wiring open circuit, ignition coil/amplifier
17779	P1371	Ignition coil/amplifier, cylinder 6 – short to positive	Wiring short to positive, ignition coil/amplifier
17780	P1372	Ignition coil/amplifier, cylinder 6 – short to earth	Wiring short to earth, ignition coil/amplifier
17781	P1373	Ignition coil/amplifier, cylinder 7 – open circuit	Wiring open circuit, ignition coil/amplifier
17782	P1374	Ignition coil/amplifier, cylinder 7 – short to positive	Wiring short to positive, ignition coil/amplifier
17783	P1375	Ignition coil/amplifier, cylinder 7 – short to earth	Wiring short to earth, ignition coil/amplifier
17784	P1376	Ignition coil/amplifier, cylinder 8 – open circuit	Wiring open circuit, ignition coil/amplifier
17785	P1377	Ignition coil/amplifier, cylinder 8 – short to positive	Wiring short to positive, ignition coil/amplifier
17786	P1378	Ignition coil/amplifier, cylinder 8 – short to earth	Wiring short to earth, ignition coil/amplifier
17793	P1385	Engine control module (ECM) – defective	ECM
17794	P1386	Engine control module (ECM), knock control – defective	ECM
17795	P1387	Engine control module (ECM), BARO sensor – defective	ECM





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## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
17796	P1388	Engine control module (ECM), ETS – defective	ECM
17797	P1389	Engine control module (ECM) 2 – defective	ECM
17799	P1391	Camshaft position (CMP) sensor 2/bank 2 – short to earth	Wiring short to earth, CMP sensor
17800	P1392	Camshaft position (CMP) sensor 2/bank 2 – open circuit/short to positive	Wiring open circuit/short to positive, CMP sensor
17801	P1393	Ignition amplifier, primary circuit 1 – circuit malfunction	Wiring, ignition amplifier, HT leads, spark plugs
17802	P1394	Ignition amplifier, primary circuit 2 – circuit malfunction	Wiring, ignition amplifier, HT leads, spark plugs
17803	P1395	Ignition amplifier, primary circuit 3 – circuit malfunction	Wiring, ignition amplifier, HT leads, spark plugs
17805	P1397	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – control limit reached	Insecure/damaged rotor, CKP/RPM sensor
17806	P1398	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – short to earth	Wiring short to earth, CKP/RPM sensor
17807	P1399	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – short to positive	Wiring short to positive, CKP/RPM sensor
17808	P1400	Exhaust gas recirculation (EGR) valve/solenoid, bank 1 – circuit malfunction	Wiring, EGR valve
17809	P1401	Exhaust gas recirculation (EGR) valve/solenoid, bank 1 – short to earth	Wiring short to earth, EGR valve
17810	P1402	Exhaust gas recirculation (EGR) valve/solenoid, bank 1 – short to positive	Wiring short to positive, EGR valve/solenoid
17811	P1403	Exhaust gas recirculation (EGR) system – control difference	Basic setting not carried out, EGR system
17812	P1404	Exhaust gas recirculation (EGR) system – basic setting	Basic setting not carried out, EGR system
17815	P1407	Exhaust gas recirculation temperature (EGRT) sensor – low input	Wiring short to earth, EGRT sensor
17816	P1408	Exhaust gas recirculation temperature (EGRT) sensor – high input	Wiring short to positive, earth wire defective, EGRT sensor
17817	P1409	Evaporative emission (EVAP) canister purge valve – circuit malfunction	Wiring, EVAP canister purge valve
17818	P1410	Evaporative emission (EVAP) canister purge valve – short to positive	Wiring short to positive, EVAP canister purge valve
17819	P1411	Secondary air injection (AIR) system, bank 2 – insufficient flow detected	Intake leak, hose(s) blocked/leaking, AIR valve/solenoid
17822	P1414	Secondary air injection (AIR) system, bank 2 – leak detected	Intake leak, hose(s) leaking, AIR valve/solenoid
17823	P1415	Exhaust gas recirculation (EGR) valve position sensor – lower limit exceeded	Basic setting not carried out
17824	P1416	Exhaust gas recirculation (EGR) valve position sensor – upper limit exceeded	Basic setting not carried out

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VAG type 5-digit	EOBD type	Fault location	Probable cause
17828	P1420	Secondary air injection (AIR) valve/solenoid – circuit malfunction	Wiring, AIR solenoid
17829	P1421	Secondary air injection (AIR) valve/solenoid – short to earth	Wiring short to earth, AIR valve/solenoid
17830	P1422	Secondary air injection (AIR) valve/solenoid – short to positive	Wiring short to positive, AIR valve/solenoid
17831	P1423	Secondary air injection (AIR) system, bank 1 – insufficient flow detected	Hose connection(s), AIR valve/solenoid
17832	P1424	Secondary air injection (AIR) system, bank 1 – leak detected	AIR valve, exhaust leak
17833	P1425	Evaporative emission (EVAP) canister purge valve – short to earth	Wiring short to earth, EVAP canister purge valve
17834	P1426	Evaporative emission (EVAP) canister purge valve – open circuit	Wiring open circuit, EVAP canister purge valve
17835	P1427	Vacuum pump, brakes – short to positive	Wiring short to positive, vacuum pump
17836	P1428	Vacuum pump, brakes – short to earth	Wiring short to earth, vacuum pump
17837	P1429	Vacuum pump, brakes – open circuit	Wiring open circuit, vacuum pump
17838	P1430	Vacuum pump, brakes – open circuit/short to positive	Wiring open circuit/short to positive, vacuum pump
17839	P1431	Vacuum pump, brakes – open circuit/short to earth	Wiring open circuit/short to earth, vacuum pump
17840	P1432	Secondary air injection (AIR) valve/solenoid – open circuit	Wiring open circuit, fuse, AIR valve/solenoid
17841	P1433	Secondary air injection (AIR) pump relay – open circuit	Wiring open circuit, fuse, AIR pump relay
17842	P1434	Secondary air injection (AIR) pump relay – short to positive	Wiring short to positive, AIR pump relay
17843	P1435	Secondary air injection (AIR) pump relay – short to earth	Wiring short to earth, AIR pump relay
17844	P1436	Secondary air injection (AIR) pump relay – circuit malfunction	Wiring, AIR pump relay
17845	P1437	Exhaust gas recirculation (EGR) valve/solenoid, bank 2 – short to positive	Wiring short to positive, EGR valve/solenoid
17846	P1438	Exhaust gas recirculation (EGR) valve/solenoid, bank 2 – open circuit/short to earth	Wiring open circuit/short to earth, EGR valve/solenoid
17847	P1439	Exhaust gas recirculation (EGR) valve position sensor – basic setting	Basic setting not carried out, EGR system
17848	P1440	Exhaust gas recirculation (EGR) valve – open circuit	Wiring open circuit, EGR valve
17849	P1441	Exhaust gas recirculation (EGR) valve/solenoid, bank 1 – open circuit/short to earth	Wiring open circuit/short to earth, EGR solenoid
17850	P1442	Exhaust gas recirculation (EGR) valve position sensor – high input	Wiring short to positive, EGR valve position sensor
17851	P1443	Exhaust gas recirculation (EGR) valve position sensor – low input	Wiring short to earth, EGR valve position sensor

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17852	P1444	Exhaust gas recirculation (EGR) valve position sensor – range/performance problem	Wiring, EGR valve position sensor
17858	P1450	Secondary air injection (AIR) system – short to positive	Wiring short to positive, AIR relay
17859	P1451	Secondary air injection (AIR) system – short to earth	Wiring short to earth, AIR relay
17860	P1452	Secondary air injection (AIR) system – open circuit	Wiring open circuit, AIR relay
17861	P1453	Exhaust gas recirculation temperature (EGRT) sensor 1/bank 1 – open circuit/short to positive	Wiring open circuit/short to positive, EGRT sensor
17862	P1454	Exhaust gas recirculation temperature (EGRT) sensor 1/bank 1 – short to earth	Wiring short to earth, EGRT sensor
17863	P1455	Exhaust gas recirculation temperature (EGRT) sensor 1/bank 1 – range/performance problem	Exhaust leak, wiring, EGRT sensor
17864	P1456	Exhaust gas recirculation temperature (EGRT) control, bank 1 – control limit reached	EGRT sensor
17865	P1457	Exhaust gas recirculation temperature (EGRT) sensor 2/bank 2 – open circuit/short to positive	Wiring open circuit/short to positive, EGRT sensor
17866	P1458	Exhaust gas recirculation temperature (EGRT) sensor 2/bank 2 – short to earth	Wiring short to earth, EGRT sensor
17867	P1459	Exhaust gas recirculation temperature (EGRT) sensor 2/bank 2 – range/performance problem	Exhaust leak, wiring, EGRT sensor
17868	P1460	Exhaust gas recirculation temperature (EGRT) control, bank 2 – control limit reached	EGRT sensor
17869	P1461	Exhaust gas recirculation temperature (EGRT) control, bank 1 – range/performance problem	Exhaust leak/blockage, EGRT sensor
17870	P1462	Exhaust gas recirculation temperature (EGRT) control, bank 2 – range/performance problem	Exhaust leak/blockage, EGRT sensor
17887	P1479	Vacuum system, brakes – mechanical fault	Vacuum pump
17908	P1500	Fuel pump relay – circuit malfunction	Wiring, fuel pump relay
17909	P1501	Fuel pump relay – short to earth	Wiring short to earth, fuel pump relay
17910	P1502	Fuel pump relay – short to positive	Wiring short to positive, fuel pump relay
17911	P1503	Alternator load signal	Wiring, alternator
17912 	P1504	Intake system – leak detected	Intake leak, EGR system, EVAP system, hose connection(s), throttle control unit
17913	P1505	Closed throttle position (CTP) switch – does not close	Throttle cable/valve, wiring open circuit/short to positive, CTP switch adjustment/defective, ECM
17914	P1506	Closed throttle position (CTP) switch – does not open	Moisture ingress, wiring short to earth, CTP switch adjustment/defective, ECM





VAG type 5-digit	EOBD type	Fault location	Probable cause
17915	P1507	Idle speed control (ISC) – lower limit reached	Throttle control unit/basic setting, intake/exhaust leak, mechanical fault, AC signals
17916	P1508	Idle speed control (ISC) – upper limit reached	Throttle control unit/basic setting, intake/exhaust leak, mechanical fault, AC signals
17917	P1509	Idle air control (IAC) valve – circuit malfunction	Wiring, IAC valve
17918	P1510	Idle air control (IAC) valve – short to positive	Wiring open circuit/short to positive, IAC valve
17919	P1511	Intake manifold air control solenoid 1 – current circuit	Wiring, intake manifold air control solenoid
17920	P1512	Intake manifold air control solenoid 1 – short to positive	Wiring short to positive, intake manifold air control solenoid
17921	P1513	Intake manifold air control solenoid 2 – short to positive	Wiring short to positive, intake manifold air control solenoid
17922	P1514	Intake manifold air control solenoid 2 – short to earth	Wiring short to earth, intake manifold air control solenoid
17923	P1515	Intake manifold air control solenoid 1 – short to earth	Wiring short to earth, intake manifold air control solenoid
17924	P1516	Intake manifold air control solenoid 1 – open circuit	Wiring open circuit, intake manifold air control solenoid
17925	P1517	Engine control relay – circuit malfunction	Wiring, engine control relay
17926	P1518	Engine control relay – short to positive	Wiring short to positive, engine control relay
17927	P1519	Camshaft position (CMP) control, bank 1 – malfunction	Cylinder head oil pressure too low, CMP actuator sticking/defective
17928	P1520	Intake manifold air control solenoid 2 – open circuit	Wiring open circuit, intake manifold air control solenoid
17930	P1522	Camshaft position (CMP) control, bank 2 – malfunction	Cylinder head oil pressure too low, CMP actuator sticking/defective
17931	P1523	SRS crash signal received	Airbag triggered
17932	P1524	Fuel pump relay – open circuit/short to earth	Wiring open circuit/short to earth, fuel pump relay
17933	P1525	Camshaft position (CMP) actuator, bank 1 – circuit malfunction	Wiring, CMP actuator
17934	P1526	Camshaft position (CMP) actuator, bank 1 – short to positive	Wiring short to positive, CMP actuator
17935	P1527	Camshaft position (CMP) actuator, bank 1 – short to earth	Wiring short to earth, CMP actuator
17936	P1528	Camshaft position (CMP) actuator, bank 1 – open circuit	Wiring open circuit, CMP actuator
17937	P1529	Camshaft position (CMP) actuator – short to positive	Wiring short to positive, CMP actuator
17938	P1530	Camshaft position (CMP) actuator – short to earth	Wiring short to earth, CMP actuator
17939	P1531	Camshaft position (CMP) actuator – open circuit	Wiring open circuit, CMP actuator
17940 ■	P1532	Idle control – lean running speed below specification	Throttle control unit
17941	P1533	Camshaft position (CMP) actuator, bank 2 – circuit malfunction	Wiring, CMP actuator



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Model: Lupo • Polo 1,3 • Polo/Classic/Estate • Golf/Vento/Bora/Cabrio  
Beetle • Passat • Corrado (08/92-95) • Sharan  
Caddy/Pickup • Transporter/Caravelle • LT 2,5 SDI/TDI

## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
17942	P1534	Camshaft position (CMP) actuator, bank 2 – short to positive	Wiring short to positive, CMP actuator
17943	P1535	Camshaft position (CMP) actuator, bank 2 – short to earth	Wiring short to earth, CMP actuator
17944	P1536	Camshaft position (CMP) actuator, bank 2 – open circuit	Wiring open circuit, CMP actuator
17945	P1537	Fuel shut-off solenoid – malfunction	Fuel shut-off solenoid (leaking/sticking)
17946	P1538	Fuel shut-off solenoid – open circuit/short to earth	Wiring open circuit/short to earth, fuel shut-off solenoid
17947	P1539	Clutch pedal position (CPP) switch – range/performance problem	Wiring, CPP switch
17948	P1540	Vehicle speed signal – high input	Excessive vehicle speed, instrument panel defective
17949	P1541	Fuel pump relay – open circuit	Wiring open circuit, fuel pump relay
17950	P1542	Throttle motor position sensor 1 – range/performance problem	Throttle valve requires cleaning, wiring, throttle motor position sensor
17951	P1543	Throttle motor position sensor 1 – low input	Wiring short to earth, throttle motor position sensor
17952	P1544	Throttle motor position sensor 1 – high input	Wiring short to positive, throttle motor position sensor
17953	P1545	Throttle valve control – malfunction	Throttle valve tight/sticking, wiring, throttle control unit
17954	P1546	Turbocharger (TC) wastegate regulating valve – short to positive	Wiring short to positive, TC wastegate regulating valve
17955	P1547	Turbocharger (TC) wastegate regulating valve – short to earth	Wiring short to earth, TC wastegate regulating valve
17956	P1548	Turbocharger (TC) wastegate regulating valve – open circuit	Wiring open circuit, TC wastegate regulating valve
17957	P1549	Turbocharger (TC) wastegate regulating valve – open circuit/short to earth	Wiring open circuit/short to earth, TC wastegate regulating valve
17958	P1550	Turbocharger (TC) pressure – control difference	Intake/exhaust leak, hoses interchanged/not connected, MAP sensor, TC wastegate regulating valve, turbocharger (TC) wastegate actuator, TC
17961	P1553	Manifold absolute pressure (MAP) sensor/barometric pressure (BARO) sensor – range/performance problem	Intake/exhaust leak, EGR system, EVAP canister purge valve, throttle control unit, wiring, MAP sensor, BARO sensor
17962	P1554	Throttle control unit – basic setting conditions	Basic setting conditions not met
17963	P1555	Turbocharger (TC) pressure – upper limit exceeded	Hoses interchanged/not connected, TC wastegate regulating valve, turbocharger (TC) wastegate actuator, TC
17964	P1556	Turbocharger (TC) pressure – control limit not reached	TC wastegate regulating valve, intake leak, TC defective
17965	P1557	Turbocharger (TC) pressure – control limit exceeded	Hose connection interchanged/not connected
17966	P1558	Idle speed control (ISC) actuator/throttle motor – circuit malfunction	Wiring, ISC actuator/throttle motor
17967	P1559	Throttle control unit – basic setting malfunction	Accelerator pedal or starter motor operated during basic setting

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## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
17968	P1560	Maximum engine RPM exceeded	Incorrect gear shift, wiring open circuit, CKP/RPM sensor
17969	P1561	Fuel quantity adjuster – control difference	Wiring, fuel injection pump
17970	P1562	Fuel quantity adjuster – upper stop value	Fuel quantity adjuster blocked/defective, stop value reached
17971	P1563	Fuel quantity adjuster – lower stop value	Fuel quantity adjuster blocked/defective, lower stop value reached
17972	P1564	Throttle control unit – voltage low during basic setting	Battery, wiring
17973	P1565	Throttle control unit – lower stop not reached	Throttle valve tight/sticking, ISC actuator
17974	P1566	AC compressor, load signal – implausible signal	Wiring, AC system
17976	P1568	Throttle control unit – mechanical fault	Throttle valve tight/sticking
17977	P1569	Cruise control master switch	Wiring, cruise control master switch
17978	P1570	Engine control module (ECM) – immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective
17979	P1571	Engine mounting control solenoid, bank 2 – short to positive	Wiring short to positive, engine mounting control solenoid
17980	P1572	Engine mounting control solenoid, bank 2 – short to earth	Wiring short to earth, engine mounting control solenoid
17981	P1573	Engine mounting control solenoid, bank 2 – open circuit	Wiring open circuit, engine mounting control solenoid
17983	P1575	Engine mounting control solenoid, bank 1 – short to positive	Wiring short to positive, engine mounting control solenoid
17984	P1576	Engine mounting control solenoid, bank 1 – short to earth	Wiring short to earth, engine mounting control solenoid
17985	P1577	Engine mounting control solenoid, bank 1 – open circuit	Wiring open circuit, engine mounting control solenoid
17987	P1579	Throttle control unit – basic setting	Basic setting not carried out
17988	P1580	Throttle motor, bank 1 – circuit malfunction	Wiring, throttle motor
17989	P1581	Throttle control unit – basic setting	Basic setting not carried out
17990	P1582	Idle speed adaptation – limit reached	Intake/exhaust leak, AIR system, fuel pressure/pump, injector(s), EVAP canister purge valve
17993	P1585	Throttle control unit – lower stop not reached	Throttle motor, throttle control unit
17994	P1586	Engine mounting control solenoid, bank 1 & 2 – short to positive	Wiring short to positive, engine mounting control solenoid
17997	P1589	AC/heater air temperature control switch – short to earth	Wiring short to earth, AC/heater air temperature control switch
17998	P1590	AC/heater air temperature control switch – open circuit	Wiring open circuit, AC/heater air temperature control switch
18000	P1592	Barometric pressure (BARO) sensor/ manifold absolute pressure (MAP) sensor – implausible ratio	TC system, MAP sensor
18001	P1593	Altitude adaption – signal outside tolerance	Intake leak, MAF sensor, throttle control unit
18007	P1599	Idle control – lean running speed above specification	IAC valve



## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
18008	P1600	Engine control module (ECM) – supply voltage low from ignition switch	Battery, alternator, wiring open circuit
18009	P1601	Engine control module (ECM) – supply voltage	Wiring, engine control relay
18010	P1602	Engine control module (ECM) – supply voltage low from battery	Battery was disconnected, battery discharged, alternator, wiring open circuit, fuse
18011	P1603	Engine control module (ECM) – defective	ECM
18012	P1604	Engine control module (ECM) – defective	ECM
18014	P1606	Rough road signal – circuit malfunction	ABS control module trouble code(s) stored, CAN data bus
18016	P1608	Power steering pressure (PSP) switch – circuit malfunction	Wiring, PSP switch
18017	P1609	Engine control module (ECM) – crash switch-off triggered	Airbag triggered
18018	P1610	Engine control module (ECM) – defective	ECM
18019	P1611	Malfunction indicator lamp (MIL) – short to earth	Wiring short to earth
18020	P1612	Engine control module (ECM) – coding	Incorrectly coded
18021	P1613	Malfunction indicator lamp (MIL) – open circuit/short to positive	Wiring open circuit/short to positive
18023	P1615	Engine oil temperature (EOT) sensor – range/performance problem	Engine oil level, wiring, EOT sensor
18024	P1616	Glow plug warning lamp – short to positive	Wiring short to positive
18025	P1617	Glow plug warning lamp – open circuit/short to earth	Bulb, wiring open circuit/short to earth
18026	P1618	Glow plug relay – short to positive	Wiring short to positive, glow plug relay
18027	P1619	Glow plug relay – open circuit/short to earth	Wiring open circuit/short to earth, glow plug relay
18028	P1620	Instrument panel, ECT signal – open circuit/short to positive	Wiring open circuit/short to positive, instrument panel
18029	P1621	Instrument panel, ECT signal – short to earth	Wiring short to earth, instrument panel
18030	P1622	Instrument panel, ECT signal – implausible signal	Wiring, instrument panel, ECT sensor
18031	P1623	CAN data bus – no signal	Trouble code(s) stored in other system(s), wiring, matching resistor in ECM
18032	P1624	Malfunction indicator lamp (MIL) – request signal active	Trouble code(s) stored in other system(s)
18033	P1625	CAN data bus, TCM – incorrect signal	TCM trouble code(s) stored, TCM incorrectly coded, wiring, matching resistor in ECM
18034	P1626	CAN data bus, TCM – no signal	TCM trouble code(s) stored, TCM incorrectly coded, wiring, matching resistor in ECM
18037	P1629	CAN data bus, cruise control – no signal	Cruise control trouble code(s) stored, wiring, matching resistor in ECM
18038	P1630	Accelerator pedal position (APP) sensor 1 – low input	Wiring short to earth, APP sensor
18039	P1631	Accelerator pedal position (APP) sensor 1 – high input	Wiring short to positive, APP sensor
18040	P1632	Accelerator pedal position (APP) sensor – supply voltage	Operating voltage too high/low, wiring



VAG type 5-digit	EOBD type	Fault location	Probable cause
18041	P1633	Accelerator pedal position (APP) sensor 2 – low input	Wiring short to earth, APP sensor
18042	P1634	Accelerator pedal position (APP) sensor 2 – high input	Wiring short to positive, APP sensor
18043	P1635	CAN data bus, AC – no signal	AC control module trouble code(s) stored, wiring, matching resistor in ECM
18044	P1636	CAN data bus, SRS – no signal	SRS control module trouble code(s) stored, wiring, matching resistor in ECM
18045	P1637	CAN data bus, electronic CE – no signal	Trouble code(s) stored, wiring, matching resistor in ECM
18047	P1639	Accelerator pedal position (APP) sensor 1/2 – range/performance problem	Wiring, APP sensor
18048	P1640	Engine control module (ECM) – defective	ECM
18050	P1642	SRS control module – system malfunction	Trouble code(s) stored
18053	P1645	CAN data bus, 4WD – no signal	4WD trouble code(s) stored, wiring, matching resistor in ECM
18056	P1648	CAN data bus – defective	Wiring, matching resistor in ECM
18057	P1649	CAN data bus, ABS – no signal	ABS control module trouble code(s) stored, wiring, matching resistor in ECM
18058	P1650	CAN data bus, instrumentation – no signal	Instrumentation control module trouble code(s) stored, wiring, matching resistor in ECM
18060	P1652	Transmission control module (TCM) – system malfunction	Trouble code(s) stored
18061	P1653	ABS control module – system malfunction	Trouble code(s) stored
18062	P1654	Instrumentation control module – system malfunction	Trouble code stored for engine oil level/temperature sensor
18064	P1656	AC signal – short to earth	Wiring short to earth
18065	P1657	AC signal – short to positive	Wiring
18066	P1658	CAN data bus, cruise control – incorrect signal	Cruise control trouble code(s) stored, wiring, matching resistor in ECM
18067	P1659	Engine coolant blower motor, speed 1 – short to positive	Wiring short to positive, engine coolant blower motor
18068	P1660	Engine coolant blower motor, speed 1 – short to earth	Wiring short to earth, engine coolant blower motor
18069	P1661	Engine coolant blower motor, speed 2 – short to positive	Wiring short to positive, engine coolant blower motor
18070	P1662	Engine coolant blower motor, speed 2 – short to earth	Wiring short to earth, engine coolant blower motor
18071	P1663	Injector, activation – short to positive	Wiring short to positive, ECM
18072	P1664	Injector, activation – current circuit	Wiring open circuit/short to earth
18073	P1665	Injector – mechanical fault	Injector
18074	P1666	Injector 1 – current circuit	Wiring open circuit/short to earth
18075	P1667	Injector 2 – current circuit	Wiring open circuit/short to earth
18076	P1668	Injector 3 – current circuit	Wiring open circuit/short to earth
18077	P1669	Injector 4 – current circuit	Wiring open circuit/short to earth



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Caddy/Pickup • Transporter/Caravelle • LT 2,5 SDI/TDI

## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
18080	P1672	Engine coolant blower motor, speed 1 – open circuit/short to earth	Wiring open circuit/short to earth
18082	P1674	CAN data bus, instrumentation – incorrect signal	Wiring, instrumentation control module trouble code(s) stored, matching resistor in ECM
18084	P1676	ETS warning lamp – circuit malfunction	Instrumentation control module trouble code(s) stored, wiring, matching resistor in ECM
18085	P1677	ETS warning lamp – short to positive	Instrumentation control module trouble code(s) stored, wiring short to positive, matching resistor in ECM
18086	P1678	ETS warning lamp – short to earth	Instrumentation control module trouble code(s) stored, wiring short to earth, matching resistor in ECM
18087	P1679	ETS warning lamp – open circuit	Instrumentation control module trouble code(s) stored, wiring open circuit, matching resistor in ECM
18088	P1680	Limp-home mode – active	Throttle control unit, APP sensor
18089	P1681	Engine control module (ECM) – programming incomplete	ECM
18090	P1682	CAN data bus, ABS – implausible signal	ABS control module trouble code(s) stored, wiring, matching resistor in ECM
18091	P1683	CAN data bus, SRS – implausible signal	SRS control module trouble code(s) stored, wiring, matching resistor in ECM
18098	P1690	Malfunction indicator lamp (MIL) – circuit malfunction	Instrumentation control module trouble code(s) stored, wiring, matching resistor in ECM
18099	P1691	Malfunction indicator lamp (MIL) – open circuit	Instrumentation control module trouble code(s) stored, wiring open circuit, matching resistor in ECM
18100	P1692	Malfunction indicator lamp (MIL) – short to earth	Instrumentation control module trouble code(s) stored, wiring short to earth, matching resistor in ECM
18101	P1693	Malfunction indicator lamp (MIL) – short to positive	Instrumentation control module trouble code(s) stored, wiring short to positive, matching resistor in ECM
18104	P1696	CAN data bus, steering column electronics – incorrect signal	Wiring, matching resistor in ECM
18259	P1851	CAN data bus, ABS – incorrect signal	ABS trouble code(s) stored, wiring, matching resistor in ECM
18261	P1853	CAN data bus, ABS – incorrect signal	ABS trouble code(s) stored, wiring, matching resistor in ECM
18262	P1854	CAN data bus, ABS – defective	ABS trouble code(s) stored, wiring, matching resistor in ECM
18308	P1900	Engine coolant blower motor, speed 2 – open circuit/short to earth	Wiring open circuit/short to earth, engine coolant blower motor
18309	P1901	Engine coolant blower motor run-on relay – short to positive	Wiring short to positive, engine coolant blower motor run-on relay
18310	P1902	Engine coolant blower motor run-on relay – open circuit/short to earth	Wiring open circuit/short to earth, engine coolant blower motor run-on relay
18311	P1903	Engine coolant hydraulic blower motor solenoid – short to positive	Wiring short to positive, engine coolant hydraulic blower motor solenoid

Model: Lupo • Polo 1,3 • Polo/Classic/Estate • Golf/Vento/Bora/Cabrio  
Beetle • Passat • Corrado (08/92-95) • Sharan  
Caddy/Pickup • Transporter/Caravelle • LT 2,5 SDI/TDI

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Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
18312	P1904	Engine coolant hydraulic blower motor solenoid – open circuit/short to earth	Wiring open circuit/short to earth, engine coolant hydraulic blower motor solenoid
18313	P1905	Charge air coolant pump relay – short to positive	Wiring short to positive, charge air coolant pump relay
18314	P1906	Charge air coolant pump relay – open circuit/short to earth	Wiring open circuit/short to earth, charge air coolant pump relay
18315	P1907	Data bus, ECM 1/2 – defective	Wiring
18316	P1908	Data bus, ECM 1/2 – software version monitoring	Data in ECM 1 & ECM 2 does not match
18317	P1909	Data bus, ECM 1/2 – no signal from ECM 1	Wiring, ECM 1
18318	P1910	Data bus, ECM 1/2 – no signal from ECM 2	Wiring, ECM 2
18318	P1911	Data bus, ECM 1/2 – circuit malfunction	Wiring, ECM 1/2
18320	P1912	Brake servo pressure sensor – open circuit/short to positive	Wiring open circuit/short to positive, brake servo pressure sensor
18321	P1913	Brake servo pressure sensor – short to earth	Wiring short to earth, brake servo pressure sensor
18322	P1914	Brake servo pressure sensor – range/performance problem	Vacuum leak, wiring, brake servo pressure sensor
18328	P1920	Engine mounting control solenoid, bank 1 & 2 – open circuit/short to earth	Wiring open circuit/short to earth, engine mounting control solenoid
18331	P1923	Engine control module (ECM) 2 – malfunction	Trouble code(s) stored
19456	P3000	CAN data bus, instrumentation – glow plug warning lamp	Wiring, matching resistor in ECM
19458	P3002	Accelerator pedal position (APP) sensor – transmission kick-down switch	APP sensor
19459	P3003	Engine coolant heater relay 1, low output	Wiring, engine coolant heater relay
19461	P3005	Engine coolant heater relay 2, high output	Wiring, engine coolant heater relay
19463	P3007	Camshaft position (CMP) sensor – no signal	Air gap, insecure sensor/rotor, wiring, CMP sensor
19464	P3008	Camshaft position (CMP) sensor – signal limit exceeded	Insecure rotor, camshaft alignment
19465	P3009	Fuel cooling pump relay – short to positive	Wiring short to positive, fuel cooling pump relay
19466	P3010	Fuel cooling pump relay – open circuit/short to earth	Wiring open circuit/short to earth, fuel cooling pump relay
19467	P3011	Fuel pump relay – short to positive	Wiring short to positive, fuel pump relay
19468	P3012	Fuel pump relay – open circuit/short to earth	Wiring open circuit/short to earth, fuel pump relay
19469	P3013	Turbocharger (TC) wastegate regulating valve B – short to positive	Wiring short to positive, TC wastegate regulating valve
19470	P3014	Turbocharger (TC) wastegate regulating valve B – open circuit/short to earth	Wiring open circuit/short to earth, TC wastegate regulating valve
19471	P3015	Fuel bypass valve – short to positive	Wiring short to positive, fuel bypass valve
19472	P3016	Fuel bypass valve – open circuit/short to earth	Wiring open circuit/short to earth, fuel bypass valve
19496	P3040	Gear ratio – implausible	Transmission fault





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Caddy/Pickup • Transporter/Caravelle • LT 2,5 SDI/TDI

## Engine management

VAG type 5-digit	EOBD type	Fault location	Probable cause
19497	P3041	CAN data bus, instrumentation – implausible ECT signal	Wiring, matching resistor in ECM
19560	P3104	Intake manifold air control solenoid – short to positive	Wiring short to positive, intake manifold air control solenoid
19561	P3105	Intake manifold air control solenoid – open circuit/short to earth	Wiring open circuit/short to earth, intake manifold air control solenoid
19717	P3262	Heated oxygen sensor (HO2S) 2, bank 1 & 2 – interchanged	HO2S 2 on bank 1 & 2 incorrectly installed
65280	–	CAN data bus, ABS – defective	ABS trouble code(s) stored, wiring, matching resistor in ECM
65535	–	Engine control module (ECM) – defective	ECM

- 1 Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.
- 2 Located at rear of exhaust camshaft.
- 3 Throttle control unit incorporates the following components: TP sensor, CTP switch (if fitted), ISC actuator/position sensor or throttle motor/position sensor.
- 4 May also produce HT voltage for cylinder 4.
- 5 May also produce HT voltage for cylinder 3.
- 6 Incorporates heated oxygen sensor (HO2S) 2.





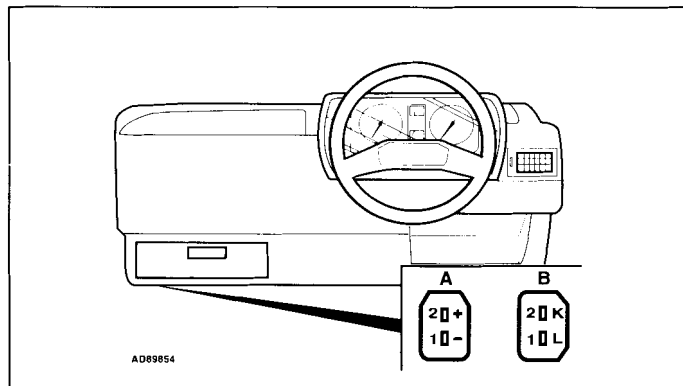
Model: Polo 1,05 • Passat 1,6 • Passat 1,8 (→08/90)  
 Year: 1988-90  
 Engine code: 1F, RP, AAK  
 System: Bosch Mono-Jetronic A2.2

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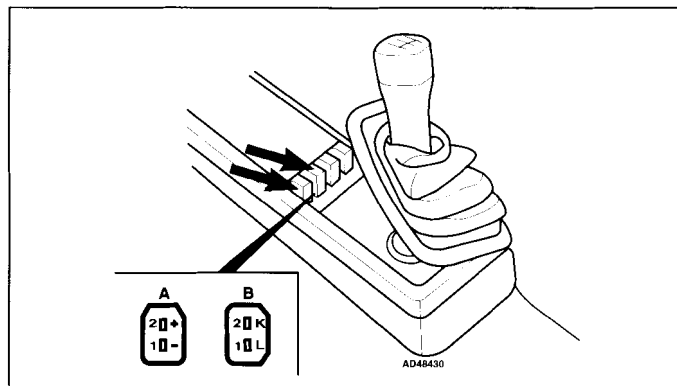


Engine management

## Data link connector (DLC) locations



Polo – fascia, driver's side



Passat – centre console (if fitted)

## Trouble codes

### General information

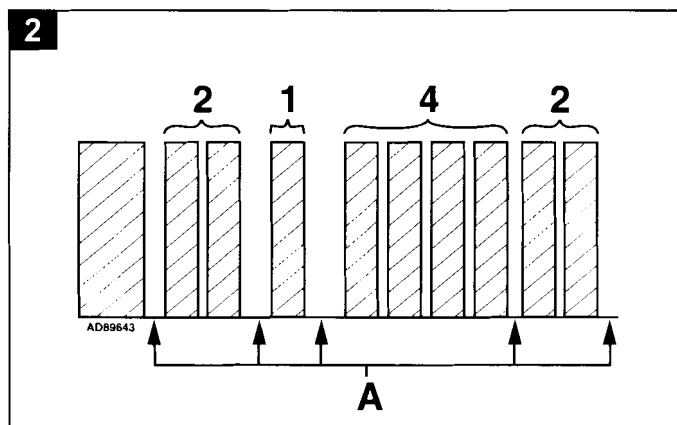
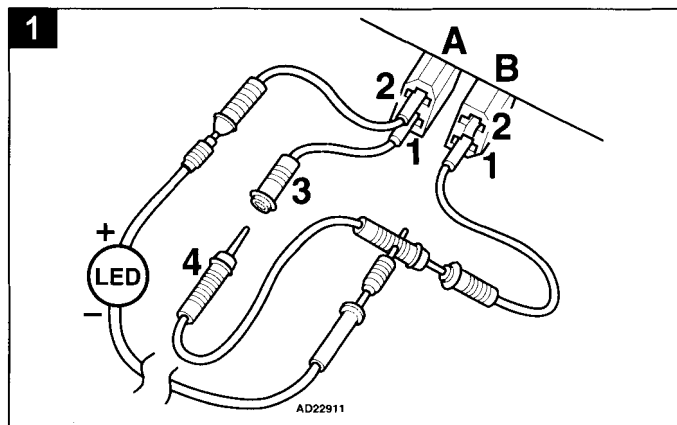
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Carry out road test for 10 minutes.

### Accessing

- Ensure ignition switched OFF.
- Connect test wire between black data link connector (DLC) terminal 1 **1** [A] and brown data link connector (DLC) terminal 1 **1** [B].
- Connect LED test lamp between black data link connector (DLC) terminal 2 **2** [A] and brown data link connector (DLC) terminal 1 **1** [B].
- Start engine. Allow to idle.

**NOTE: If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.**

- Bridge test wire terminals 3 and 4 **1**.
- Disconnect test wire after 5 seconds.
- Check that LED flashes.
- Count LED flashes. Note trouble code.
- Each trouble code consists of four groups of one to four flashes.
- A 2,5 second pause separates each trouble code group **2** [A].
- Repeat operation. Note trouble codes. Compare with trouble code table.
- End of test sequence indicated by trouble code 0000 (long flashes).
- Switch ignition OFF. Rectify faults as necessary.





## Engine management

### Erasing

#### Method 1

- Ensure ignition switched OFF.
- Connect test wire between black data link connector (DLC) terminal 1 **1** [A] and brown data link connector (DLC) terminal 1 **1** [B].
- Bridge test wire terminals 3 and 4 **1**.
- Switch ignition ON.
- Disconnect test wire after 5 seconds.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

#### Method 2

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug or battery earth lead.

**NOTE:** *ECM adaptive memory may be erased causing erratic running faults. Carry out road test to allow ECM to re-learn basic values.*

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

### Trouble code identification

Flash type	Fault location	Probable cause
0000	End of test sequence	–
1111	Engine control module (ECM)	ECM
1232	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch, ignition timing vacuum control valve, TP sensor
2122	Engine RPM signal	Wiring, CKP sensor, ignition amplifier
2212	Throttle position (TP) sensor	Wiring, TP sensor
2312	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
2322	Intake air temperature (IAT) sensor	Wiring, IAT sensor
2341 <b>1</b>	Oxygen sensor (O2S)/heated oxygen sensor (HO2S) – lambda control	Intake/exhaust leak, low compression, ignition system, fuel pressure/pump, injector, wiring, O2S
2342	Oxygen sensor (O2S)	Wiring, O2S
2343 <b>2</b>	Mixture control (MC)	Intake/exhaust leak, low compression, ignition system, fuel pressure/pump, injector
4431	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
4444	No fault found	–

- 1** After repairs, erase trouble code and learnt lambda control values by disconnecting battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.



Model: Polo 1,05/1,3 (→08/93) • Passat 1,8 (RP 08/90 →)  
 Passat 1,8 (AAM →06/92)  
 Passat 1,8 (ABS →06/92)

Year: 1990-93

Engine code: AAM, ABD, ABS, AAU, AAV, RP

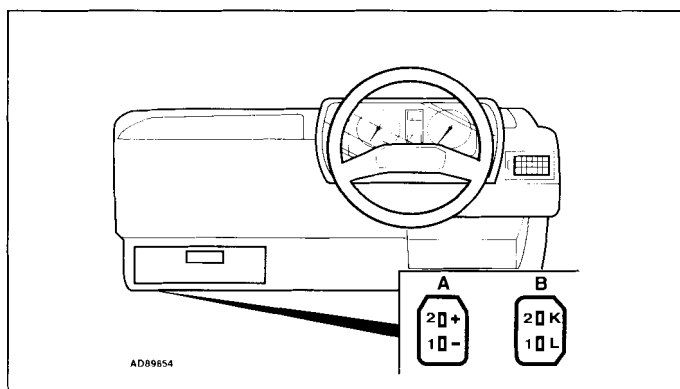
System: Bosch Mono-Motronic MA1.2  
 Bosch Mono-Motronic MA1.2.1

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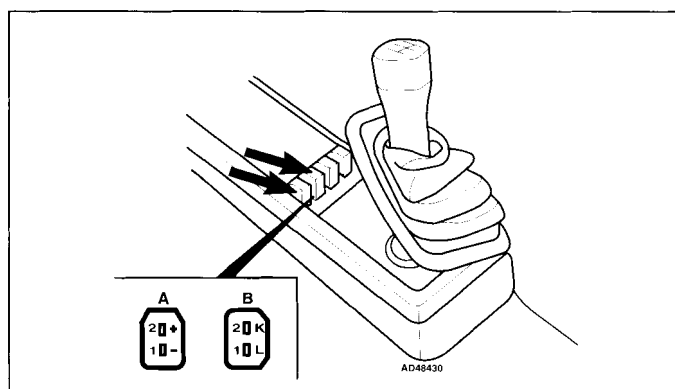


Engine management

## Data link connector (DLC) locations



Polo – under fascia, near glovebox



Passat – centre console

## Trouble codes

**NOTE:** 35 pin ECM multi-plug.

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to one of the ECM terminals.
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Self-diagnosis using flash type trouble codes may not display all available diagnostic information.
- Carry out road test for at least 10 minutes.
- Ensure accelerator pedal is briefly fully depressed and engine speed exceeds 3000 rpm.

### Accessing

- Ensure ignition switched OFF.
- Bridge black data link connector (DLC) terminal 1 **1** [A] and brown or white data link connector (DLC) terminal 1 **1** [B] with a switched lead – contacts normally open.
- Connect LED test lamp between black data link connector (DLC) terminal 2 **2** [A] and ECM terminal 33.
- ECM located in plenum chamber.

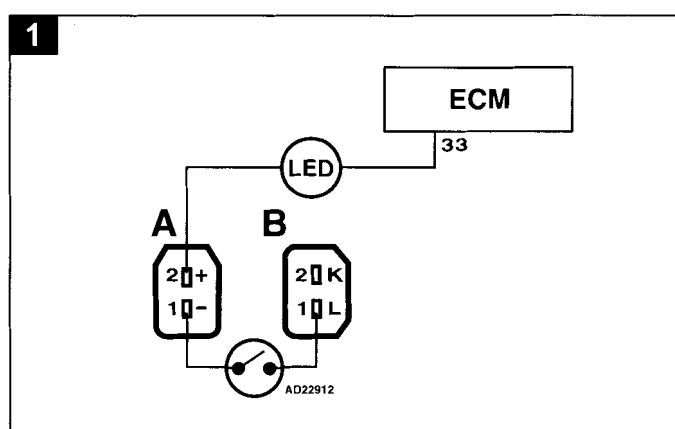
**NOTE:** *DO NOT disconnect ECM multi-plug as this will erase fault memory.*

- Start engine. Allow to idle.

**NOTE:** *If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.*

- Operate switch for 4 seconds minimum.

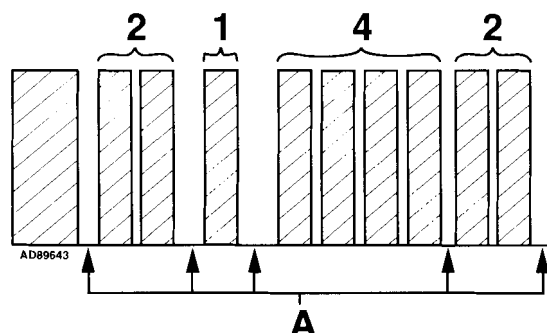
- Release switch. Check that LED flashes.
- Count LED flashes. Note trouble code.
- Each trouble code consists of four groups of one to four flashes.
- A 2,5 second pause separates each trouble code group **2** [A].
- Repeat switch operation. Note trouble codes. Compare with trouble code table.
- End of test sequence indicated by trouble code 0000 (long flashes).
- Switch ignition OFF. Rectify faults as necessary.





## Engine management

2



### Erasing

#### Method 1

- Ensure ignition switched OFF.
- Bridge black data link connector (DLC) terminal 1 **1** [A] and brown or white data link connector (DLC) terminal 1 [B] with a switched lead – contacts normally open.
- Operate switch and hold.
- Switch ignition ON.
- Release switch after 5 seconds minimum.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

#### Method 2

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug or battery earth lead.

**NOTE:** ECM adaptive memory may be erased causing erratic running faults. Carry out road test to allow ECM to re-learn basic values.

**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).

### Trouble code identification

Flash type 4-digit	Fault location	Probable cause
0000	End of test sequence	–
1111	Engine control module (ECM)	ECM
1231	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
1232	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
2113 <b>1</b>	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Insecure rotor, wiring, CKP/RPM sensor
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
2212	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
2234	Engine control module (ECM) – supply voltage	Battery, wiring
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2322	Intake air temperature (IAT) sensor	Wiring, IAT sensor
2341 <b>2</b>	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
2342	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
2413 <b>2</b>	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
4444	No fault found	–

**1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP/RPM sensor signal. Ignore trouble code if engine starts.

**2** After repairs, erase learnt lambda control values: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.

Model: Polo 1,05/1,3 (→08/93) • Passat 1,8 (RP 08/90→)  
Passat 1,8 (AAM →06/92) • Passat 1,8 (ABS →06/92)

**VOLKSWAGEN**



Engine management

VAG type 5-digit	Fault location	Probable cause
00000	No fault found	–
00281	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00282	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
00515	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Insecure rotor, wiring, CKP/RPM sensor
00516	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
00518	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	Intake air temperature (IAT) sensor	Wiring, IAT sensor
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
00532	Engine control module (ECM) – supply voltage	Battery, wiring
00537	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
00561	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
00670	Idle speed control (ISC) actuator position sensor	Wiring, throttle valve, ISC actuator position sensor
17978	Engine control module (ECM) immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective
65535	Engine control module (ECM)	ECM

**1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP/RPM sensor signal. Ignore trouble code if engine starts.

**2** After repairs, erase learnt lambda control values: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.





# VOLKSWAGEN

**Model:** Polo 1,05/1,3 (08/93 →) • Polo Classic/Estate 1,6/1,8 • Golf/Vento 1,4 (07/92 →) • Golf/Vento 1,6  
Golf/Vento/Cabrio 1,8 (07/93 →) • Passat 1,8 (AAM, ADZ 07/94 →) • Passat 1,8 (ABS 10/93 →)  
Caddy/Pickup 1,6

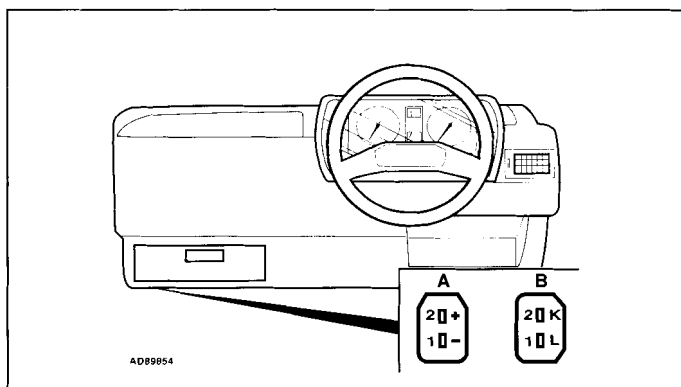
**Year:** 1992-02

**Engine code:** 1F, AAM, AAU, AAV, ABD, ABS, ABU, ADX, ADZ, AEA, AEV, ANN, ANP

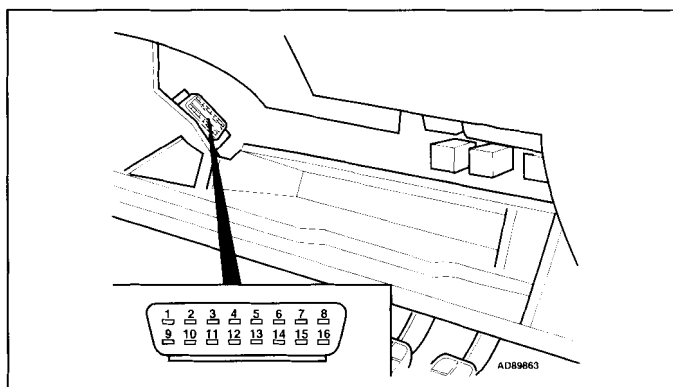
**System:** Bosch Mono-Motronic MA1.2.3 • Bosch Mono-Motronic MA1.3

## Engine management

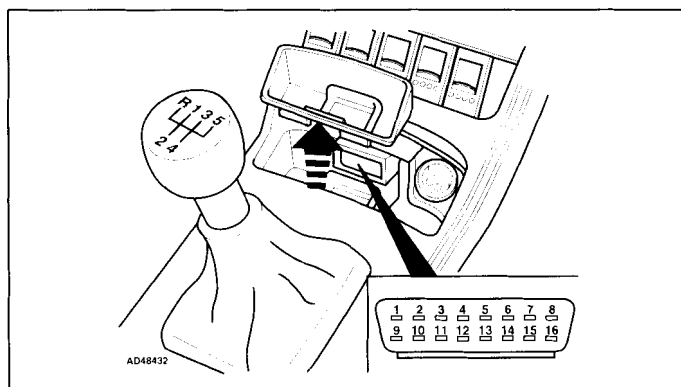
### Data link connector (DLC) locations



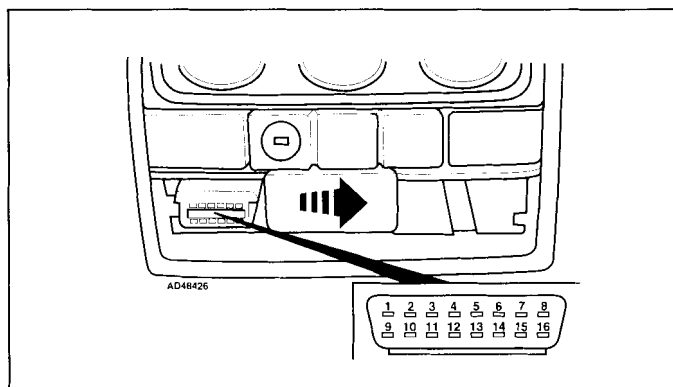
Polo →1994 – under fascia, near glovebox



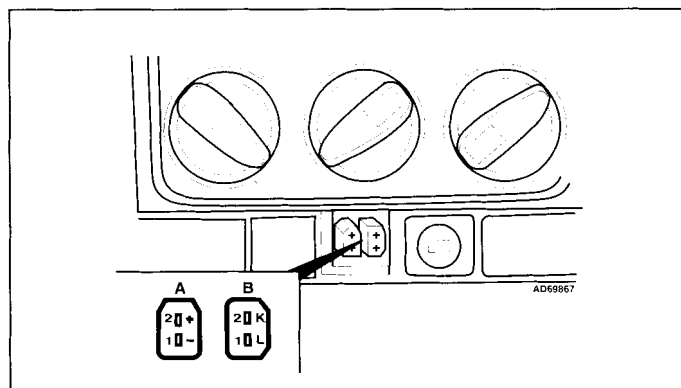
Polo 1994 →, Classic/Estate →09/99 – driver's glovebox



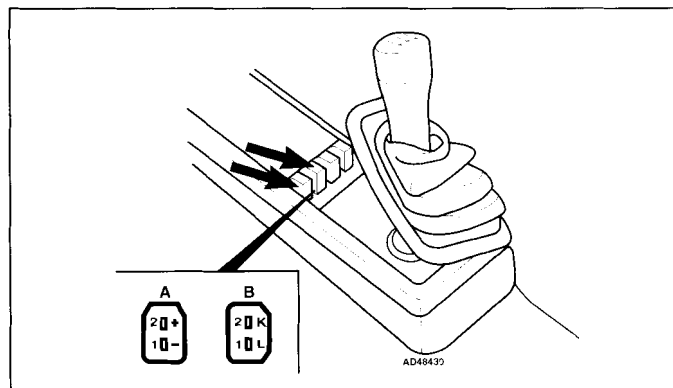
Classic/Estate 10/99 → – under front ashtray



Golf/Vento 08/93 →, Cabrio – adjacent to ashtray



Golf/Vento →07/93 – below heater controls



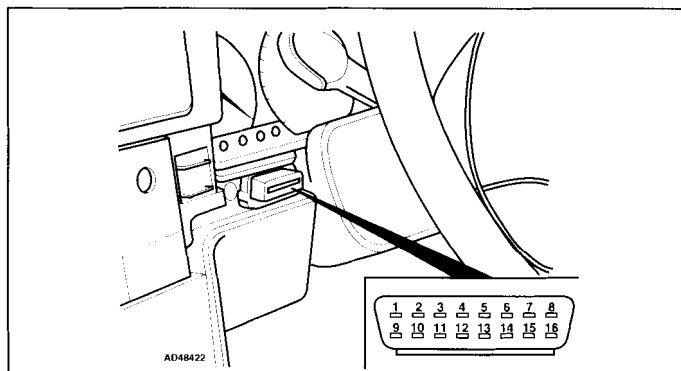
Passat →1993 – centre console

Model: Polo 1,05/1,3 (08/93→) • Polo Classic/Estate 1,6/1,8  
 Golf/Vento 1,4 (07/92→) • Golf/Vento 1,6  
 Golf/Vento/Cabrio 1,8 (07/93→) • Passat 1,8 (AAM, ADZ 07/94→)  
 Passat 1,8 (ABS 10/93→) • Caddy/Pickup 1,6

**VOLKSWAGEN**



Engine management



Passat 1994→ – adjacent to steering column

## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Carry out road test for at least 10 minutes.

- Ensure accelerator pedal is briefly fully depressed and engine speed exceeds 3000 rpm.
- If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.
- Data link connector (DLC) – 2-pin: (A) black, (B) brown/white.

### Accessing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**NOTE:** Brown or white data link connector (DLC) terminal 1 is not connected to ECM terminal 11.

### Erasing

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug or battery earth lead.

**NOTE:** ECM adaptive memory may be erased causing erratic running faults. Carry out road test to allow ECM to re-learn basic values.

- Diagnostic equipment can also be used to erase data from ECM fault memory.

**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).

### Trouble code identification

VAG type	Fault location	Probable cause
00000	No fault found	–
00281	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00282	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
00515 1	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Insecure rotor, wiring, CKP/RPM sensor
00516	Closed throttle position (CTP) switch	Accelerator cable adjustment, wiring, CTP switch
00518	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	Intake air temperature (IAT) sensor	Wiring, IAT sensor
00524	Knock sensor (KS)	Wiring, KS
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
00532	Engine control module (ECM) – supply voltage	Battery, wiring
00537 2	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
00561 2	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
00670	Idle speed control (ISC) actuator position sensor	Wiring, throttle valve, ISC actuator position sensor
17978	Engine control module (ECM) immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective
65535	Engine control module (ECM)	ECM

**1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP/RPM sensor signal. Ignore trouble code if engine starts.

**2** After repairs, erase learnt lambda control values as follows:

Polo →1994, Golf/Vento →07/93 & Passat: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Except Polo →1994, Golf/Vento →07/93 & Passat: Erase using diagnostic equipment. Carry out road test to allow ECM to re-learn basic values.





# VOLKSWAGEN

Model: Golf/Vento 1,4 (→07/92) • Golf/Vento 1,8 (→07/93)  
 Passat 1,8 (AAM →07/94)  
 Passat 1,8 (ABS →10/93)

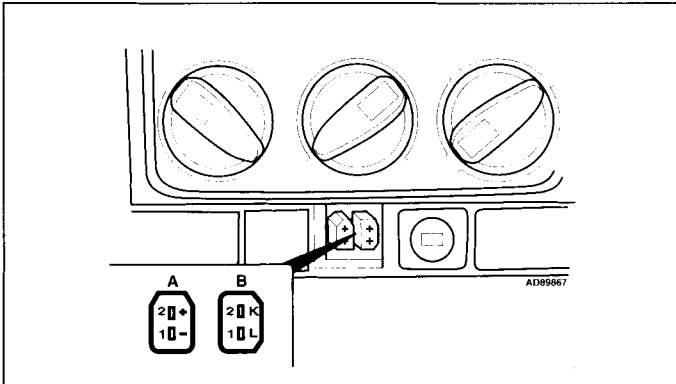
Year: 1991-1994

Engine code: AAM, ABD, ABS, AAU, AAV, RP

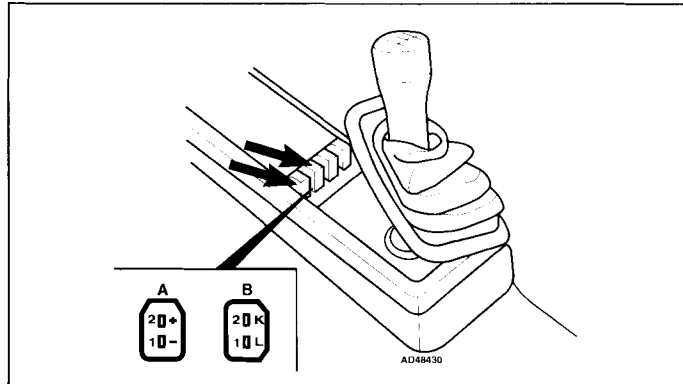
System: Bosch Mono-Motronic MA1.2.2

## Engine management

### Data link connector (DLC) locations



Golf/Vento – below heater controls



Passat – centre console

### Trouble codes

NOTE: 45 pin ECM multi-plug.

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to one of the ECM terminals.
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Self-diagnosis using flash type trouble codes may not display all available diagnostic information.
- Carry out road test for at least 10 minutes.
- Ensure accelerator pedal is briefly fully depressed and engine speed exceeds 3000 rpm.

#### Accessing

- Ensure ignition switched OFF.
- Bridge black data link connector (DLC) terminal 1 **1** [A] and brown or white data link connector (DLC) terminal 1 **1** [B] with a switched lead – contacts normally open.

NOTE: **Brown or white data link connector (DLC) terminal 1 is connected to ECM terminal 11.**

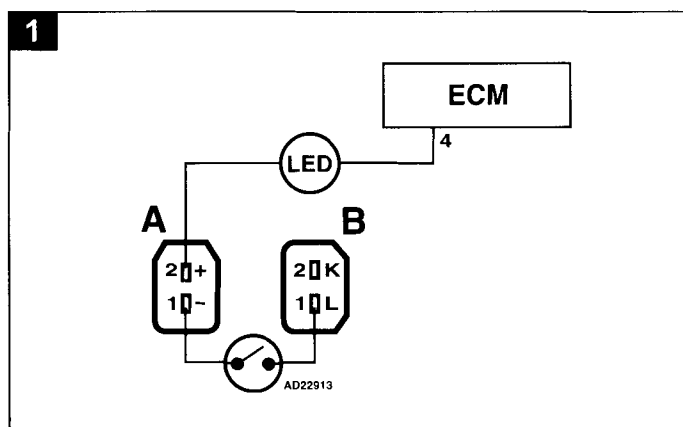
- Connect LED test lamp between black data link connector (DLC) terminal 2 **1** [A] and ECM terminal 4.
- ECM located in plenum chamber.

NOTE: **DO NOT disconnect ECM multi-plug as this will erase fault memory.**

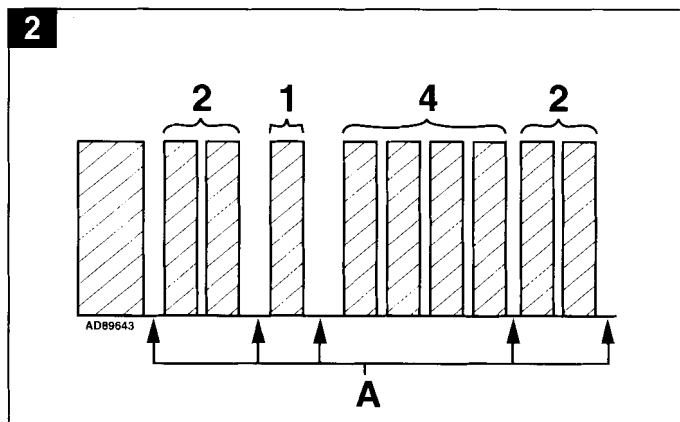
- Start engine. Allow to idle.

NOTE: **If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.**

- Operate switch for 4 seconds minimum.
- Release switch. Check that LED flashes.
- Count LED flashes. Note trouble code.
- Each trouble code consists of four groups of one to four flashes.
- A 2,5 second pause separates each trouble code group **2** [A].
- Repeat switch operation. Note trouble codes. Compare with trouble code table.
- End of test sequence indicated by trouble code 0000 (long flashes).
- Switch ignition OFF. Rectify faults as necessary.







### Erasing

#### Method 1

- Ensure ignition switched OFF.
- Bridge black data link connector (DLC) terminal 1 **1** [A] and brown or white data link connector (DLC) terminal 1 **1** [B] with a switched lead – contacts normally open.
- Connect LED test lamp between data link connector (DLC) terminal 2 **1** [A] and ECM terminal 4.

- Access trouble codes. Switch ignition OFF.
- Operate switch and hold.
- Switch ignition ON.
- Release switch after 5 seconds. Check that LED flashes.
- Idle speed control (ISC) actuator activated. Trouble code displayed: 1232.
- Operate switch for 4-6 seconds to activate each of the following components:
  - Intake manifold heater. Trouble code displayed: 4342.
  - Evaporative emission (EVAP) canister purge valve. Trouble code displayed: 4343.
- After activation of last component operate switch for 4-6 seconds to display flash code 0000 (long flashes).
- Fault memory automatically erased.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

#### Method 2

- Ensure ignition switched OFF.
- Disconnect ECM multi-plug or battery earth lead.

**NOTE:** *ECM adaptive memory may be erased causing erratic running faults. Carry out road test to allow ECM to re-learn basic values.*

**WARNING:** *Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).*

### Trouble code identification

Flash type 4-digit	Fault location	Probable cause
0000	End of test sequence	–
1111	Engine control module (ECM)	ECM
1231	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
1232	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
2113 <b>1</b>	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
2212	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
2234	Engine control module (ECM) – supply voltage	Battery, wiring
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2322	Intake air temperature (IAT) sensor	Wiring, IAT sensor
2341 <b>2</b>	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
2342	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
2413 <b>2</b>	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
4444	No fault found	–

- 1** Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.
- 2** After repairs, erase learnt lambda control values: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.

**VOLKSWAGEN**

Model: Golf/Vento 1,4 (→07/92) • Golf/Vento 1,8 (→07/93)  
 Passat 1,8 (AAM →07/94) • Passat 1,8 (ABS →10/93)

**Engine management**

VAG type 5-digit	Fault location	Probable cause
00000	No fault found	—
00281	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00282	Idle speed control (ISC) actuator	Wiring, multi-plug incorrectly wired, ISC actuator
00515 <sup>1</sup>	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor
00516	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, wiring, CTP switch
00518	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	Intake air temperature (IAT) sensor	Wiring, IAT sensor
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
00532	Engine control module (ECM) – supply voltage	Battery, wiring
00537 <sup>2</sup>	Heated oxygen sensor (HO2S) – lambda control	Heating inoperative, exhaust leak, misfire, fuel pressure/pump, EVAP canister purge valve
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
00561 <sup>2</sup>	Mixture control (MC)	Fuel level low, fuel pressure/pump, intake/exhaust leak, misfire, HO2S, EVAP canister purge valve, injector, excessive fuel in engine oil
00670	Idle speed control (ISC) actuator position sensor	Wiring, throttle valve, ISC actuator position sensor
17978	Engine control module (ECM) immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective
65535	Engine control module (ECM)	ECM

<sup>1</sup> Trouble code may be displayed if engine is not idling during self-diagnosis due to missing CKP sensor signal. Ignore trouble code if engine starts.

<sup>2</sup> After repairs, erase learnt lambda control values: Wait 30 seconds. Disconnect battery or ECM multi-plug for at least 30 seconds. Carry out road test to allow ECM to re-learn basic values.



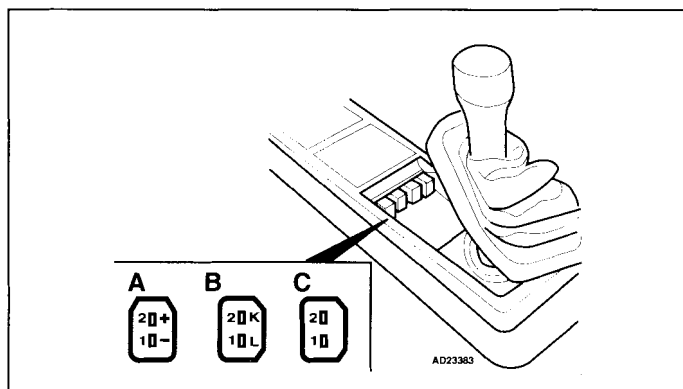
Model: Jetta 2,0 16V • Passat 2,0 16V • Corrado 2,0 16V  
 Year: 1988-95  
 Engine code: 9A  
 System: Bosch KE-Motronic 1.2/1.2.1/1.2.2

**VOLKSWAGEN**



Engine management

## Data link connector (DLC) locations



Near gear lever

## Trouble codes

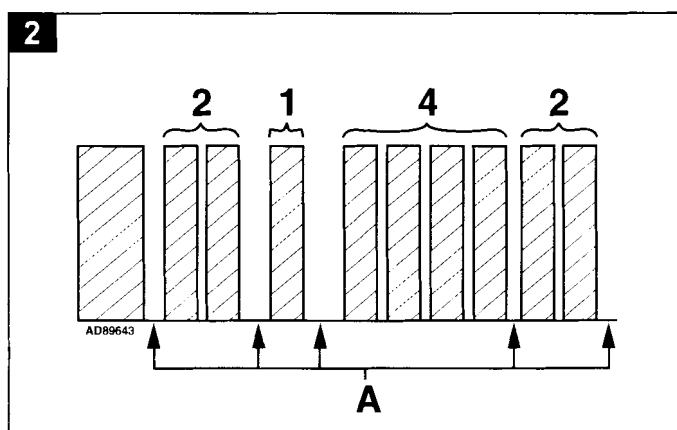
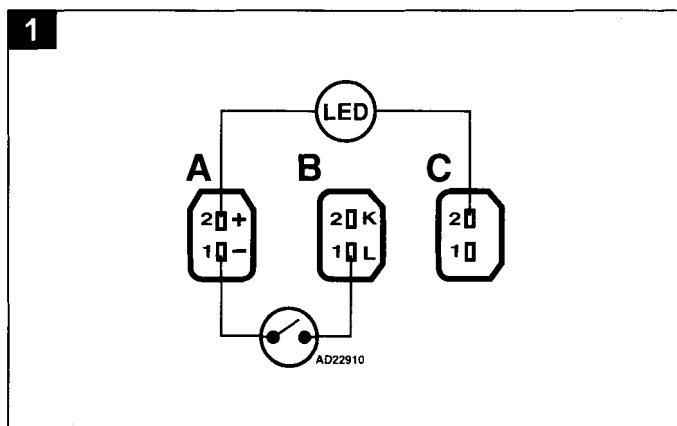
### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Self-diagnosis using flash type trouble codes may not display all available diagnostic information.
- Carry out road test for at least 5 minutes.
- Briefly fully depress throttle pedal to increase engine speed over 3000 rpm.
- Allow to idle for 2 minutes.
- If engine does not start: Crank engine for 6 seconds.

### Accessing

- Ensure ignition switched OFF.
- Connect LED test lamp between black data link connector (DLC) terminal 2 **1** [A] and blue data link connector (DLC) terminal 2 **1** [C].
- Bridge black data link connector (DLC) terminal 1 **1** [A] and brown/white/yellow data link connector (DLC) terminal 1 **1** [B] with a switched lead – contacts normally open.
- Switch ignition ON.
- Operate switch for 4-6 seconds.
- Release switch. Check that LED flashes.
- Count LED flashes. Note trouble code.
- Each trouble code consists of four groups of one to four flashes.
- A 2.5 second pause separates each trouble code group **2** [A].
- Repeat switch operation. Note trouble codes. Compare with trouble code table.

- End of test sequence indicated by trouble code 0000 (long flashes).
- Switch ignition OFF. Rectify faults as necessary.



**Engine management****Erasing**

- Ensure ignition switched OFF.
- Connect LED test lamp between black data link connector (DLC) terminal 2 **1** [A] and blue data link connector (DLC) terminal 2 **1** [C].
- Bridge black data link connector (DLC) terminal 1 **1** [A] and brown/white/yellow data link connector (DLC) terminal 1 **1** [B] with a switched lead – contacts normally open.
- Access trouble codes. Switch ignition OFF.
- Operate switch. Switch ignition ON after 4-6 seconds.
- Release switch after 4-6 seconds. Check that LED flashes.
- Differential pressure regulator activated. Trouble code displayed: 4341.
- Operate switch for 4-6 seconds to activate each of the following components:
- Evaporative emission (EVAP) canister purge valve. Trouble code displayed: 4343.
- Idle air control (IAC) valve. Trouble code displayed: 4431.
- Cold start injector. Trouble code displayed: 4443.
- After activation of last component operate switch for 4-6 seconds to display flash code 0000 (long flashes).
- Operate switch for 4-6 seconds to erase fault memory.
- Repeat checking procedure to ensure no data remains in ECM fault memory.

**Trouble code identification**

Flash type 4-digit	Fault location	Probable cause
0000	End of test sequence	–
1111	Engine control module (ECM)	ECM
1231	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
2112	Camshaft position (CMP) sensor, cylinder 4 HT lead	CMP sensor tabs not facing towards distributor, spark plug(s), HT lead(s), distributor cap/rotor, wiring, CMP sensor
2113	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor, volume air flow (VAF) sensor plate tight/sticking
2121	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, throttle valve tight/sticking, wiring, CTP switch
2123	Wide open throttle (WOT) switch	Accelerator cable adjustment, WOT switch adjustment, wiring, WOT switch
2141	Knock control – control limit exceeded	Incorrect fuel/compression, ignition timing, screening of KS wiring, insecure engine component
2142	Knock sensor (KS) 1	Wiring, KS, ECM
2144	Knock sensor (KS) 2	Wiring, KS, ECM
2231	Idle speed control	Ignition timing, EVAP canister purge valve 1/2, intake leak, VAF sensor, throttle valve adjustment, AC signal missing, wiring
2232	Volume air flow (VAF) sensor	Wiring, VAF sensor
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2341	Heated oxygen sensor (HO2S) – lambda control	Mixture adjustment, HO2S heater/wiring, cold start injector, EVAP canister purge valve, intake/exhaust leak, ECM earth wire to intake manifold
2342	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative
4431	Idle air control (IAC) valve	Wiring, IAC valve, ECM
4444	No fault found	–



VAG type 5-digit	Fault location	Probable cause
00000	No fault found	—
00281	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
00514	Camshaft position (CMP) sensor, cylinder 4 HT lead	CMP sensor tabs not facing towards distributor, spark plug(s), HT lead(s), distributor cap/rotor, wiring, CMP sensor
00515	Crankshaft position (CKP) sensor	Insecure rotor, wiring, CKP sensor, volume air flow (VAF) sensor plate tight/sticking
00516	Closed throttle position (CTP) switch	Accelerator cable adjustment, CTP switch adjustment, throttle valve tight/sticking, wiring, CTP switch
00517	Wide open throttle (WOT) switch	Accelerator cable adjustment, wiring, WOT switch
00520	Volume air flow (VAF) sensor	Wiring, VAF sensor
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00524	Knock sensor (KS) 1	Wiring, KS, ECM
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative
00533	Idle speed control	Ignition timing, EVAP canister purge valve 1/2, intake leak, VAF sensor, throttle valve adjustment, AC signal missing, wiring
00535	Knock control – control limit exceeded	Incorrect fuel/compression, ignition timing, screening of KS wiring, insecure engine component
00537	Heated oxygen sensor (HO2S) – lambda control	Mixture adjustment, HO2S heater/wiring, cold start injector, EVAP canister purge valve, intake/exhaust leak, ECM earth wire to intake manifold
00540	Knock sensor (KS) 2	Wiring, KS, ECM
00558	Mixture control (MC) – mixture lean	ECM earth wire to intake manifold, intake leak, idle speed adjustment
00559	Mixture control (MC) – mixture rich	Injector(s), cold start injector, idle speed adjustment
00587	Mixture control (MC)	ECM earth wire to intake manifold, intake leak, idle speed adjustment, injector(s), cold start injector
01257	Idle air control (IAC) valve	Wiring, IAC valve, ECM
17978	Engine control module (ECM) – immobilizer active	Incorrect/damaged key, incorrectly coded, ECM/immobilizer replacement without coding, wiring, immobilizer defective
65535	Engine control module (ECM)	ECM



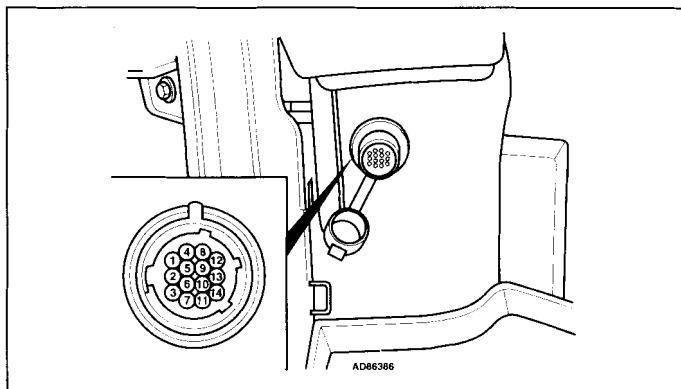


# VOLKSWAGEN

Model: LT 2,3  
Year: 1996-04  
Engine code: AGL  
System: Bosch Motronic

## Engine management

### Data link connector (DLC) locations



Fascia

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Carry out road test for at least 10 minutes.
- Ensure accelerator pedal is briefly fully depressed and engine speed exceeds 3500 rpm.
- If engine does not start: Crank engine for 6 seconds. Leave ignition switched ON.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

#### Trouble code identification

VAG type	Fault location	Probable cause
00000	No fault found	—
81002	Engine coolant temperature (ECT) sensor – short circuit	Wiring short circuit, ECT sensor
81003	Engine coolant temperature (ECT) sensor – broken wire	Wiring open/short circuit, poor connection, ECT sensor
81004	Engine coolant temperature (ECT) sensor – range/performance problem	ECT defective, ECM
81005	Engine coolant temperature (ECT) sensor – loose connection	Wiring, multi-plug, ECT sensor
81006	Intake air temperature (IAT) sensor – short circuit	Wiring short circuit, IAT sensor
81007	Intake air temperature (IAT) sensor – broken wire	Wiring open/short circuit, poor connection, IAT sensor
81008	Intake air temperature (IAT) sensor – loose connection	Wiring, multi-plug, IAT sensor



VAG type	Fault location	Probable cause
81009	Manifold absolute pressure (MAP) sensor – range/performance problem	Hoses blocked/leaking, ECM
81010	Manifold absolute pressure (MAP) sensor – no signal	Hoses interchanged/not connected, ECM
81011	Closed throttle position (CTP) switch – switch contacts always closed	Wiring short circuit, CTP switch
81012	Closed throttle position (CTP) switch – loose connection	Wiring, multi-plug, CTP switch
81068	Closed throttle position (CTP) switch – switch contacts always open	Wiring open circuit, throttle valve tight/sticking, ISC actuator, CTP switch
81013	Throttle position (TP) sensor – high input	Wiring short to positive, TP sensor
81014	Throttle position (TP) sensor – low input	Wiring short to earth, TP sensor
81015	Throttle position (TP) sensor – loose connection	Wiring, multi-plug, TP sensor
81016	Idle speed control (ISC) actuator position sensor – high input	Wiring short to positive, ISC actuator position sensor
81017	Idle speed control (ISC) actuator position sensor – low input	Wiring short to earth, ISC actuator position sensor
81018	Idle speed control (ISC) actuator position sensor – loose connection	Wiring, multi-plug, ISC actuator position sensor
81019	Idling control – lower limit reached	Intake leak
81020	Idling control – upper limit reached	ISC actuator/position sensor
81021	Idling control – limp-home mode	ISC actuator/position sensor, intake leak
81022	Heated oxygen sensor (HO2S) – high voltage	Wiring short to positive, HO2S
81023	Heated oxygen sensor (HO2S) – broken wire	Wiring open circuit, HO2S
81024	Heated oxygen sensor (HO2S) – range/performance problem	HO2S
81025	Heated oxygen sensor (HO2S) – heater short to earth	Wiring short to earth, HO2S
81026	Heated oxygen sensor (HO2S) – heater short to positive	Wiring short to positive, HO2S
81027	Heated oxygen sensor (HO2S) – broken wire	Wiring open circuit, HO2S
81028	Lambda regulation – control limit exceeded	Fuel pressure/pump, ignition system, intake/exhaust leak, injector(s), HO2S, EVAP canister purge valve
81029	Heated oxygen sensor (HO2S) – lambda control limit not reached	Fuel pressure, ignition system, intake/exhaust leak, injector(s), HO2S/heating, EVAP canister purge valve
81030	Injectors 1 & 4 – short to positive	Wiring short to positive, injector
81031	Injectors 1 & 4 – open circuit/short to earth	Wiring open circuit/short to earth, injector
81032	Injectors 2 & 3 – short to positive	Wiring short to positive, injector
81033	Injectors 2 & 3 – open circuit/short to earth	Wiring open circuit/short to earth, injector
81034	Mixture control (MC), idling – too rich	Fuel pressure, ignition system, injector(s), HO2S/heating, exhaust leak, EVAP canister purge valve
81035	Mixture control (MC), idling – too lean	Fuel pressure, ignition system, intake leak, injector(s), HO2S/heating, exhaust leak
81036	Mixture control (MC), partial load – too rich	Fuel pressure, ignition system, injector(s), HO2S/heating, exhaust leak, EVAP canister purge valve
81037	Mixture control (MC), partial load – too lean	Fuel pressure, ignition system, intake leak, injector(s), HO2S/heating, exhaust leak
81038	Ignition coil/amplifier, cylinders 1 & 4 – short to positive	Wiring, ignition coil/amplifier



**Engine management**

VAG type	Fault location	Probable cause
81039	Ignition coil/amplifier, cylinders 1 & 4 – ignition failure	Poor connection, wiring, HT lead, spark plugs, ignition coil/amplifier
81040	Ignition coil/amplifier, cylinders 1 & 4 – current too low	Wiring short to earth, ignition coil/amplifier
81041	Ignition coil/amplifier, cylinders 2 & 3 – short to positive	Wiring, ignition coil/amplifier
81042	Ignition coil/amplifier, cylinders 2 & 3 – ignition failure	Poor connection, wiring, HT lead, spark plugs, ignition coil/amplifier
81043	Ignition coil/amplifier, cylinders 2 & 3 – current too low	Wiring short to earth, ignition coil/amplifier
81044	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal/implausible signal	Wiring, air gap, metal particles, insecure sensor/rotor, CKP/RPM sensor
81045	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Air gap, metal particles
81046	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – engine RPM implausible	Air gap, metal particles
81047	Engine control module (ECM), module coding plug – short to earth	Module coding plug short to earth
81048	Engine control module (ECM), module coding plug – short to positive	Module coding plug short to positive
81049	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – signal short to earth	Wiring short to earth, ECM
81050	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – signal short to positive	Wiring short to positive, ECM
81051	Vehicle speed sensor (VSS) – no signal	Vehicle speedometer, wiring open circuit, VSS
81052	Vehicle speed sensor (VSS) – implausible signal	Wiring, VSS
81055	Fuel pump relay – open circuit/short to positive	Wiring open circuit/short to positive, fuel pump relay
81056	Fuel pump relay – open circuit/short to earth	Wiring open circuit/short to earth, fuel pump relay
81059	Evaporative emission (EVAP) canister purge valve – open circuit/short to positive	Wiring open circuit/short to positive, EVAP canister purge valve
81060	Evaporative emission (EVAP) canister purge valve – open circuit/short to earth	Wiring open circuit/short to earth, EVAP canister purge valve
81061	Mixture control (MC) – limit exceeded	Fuel pressure, injector(s), HO2S/heating, exhaust leak, EVAP canister purge valve
81063	Engine control module (ECM) – supply voltage low	Battery, wiring
81069	Exhaust brake solenoid – short to positive	Wiring short to positive, exhaust brake solenoid
81070	Exhaust brake solenoid – open circuit/short to earth	Wiring open circuit/short to earth, exhaust brake solenoid
81071	Vehicle speed sensor (VSS) – speed deviation too large	Instrumentation control module incorrectly coded
81072	Vehicle speed sensor (VSS) – implausible signal	Wiring, vehicle speedometer, VSS





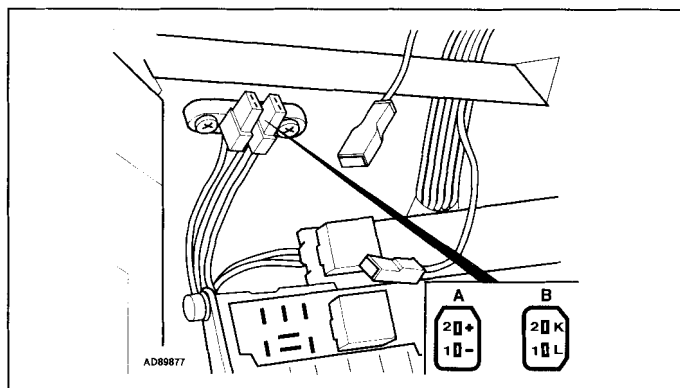
Model: LT/4x4 2,4  
 Year: 03/95-96  
 Engine code: 1E  
 System: Bosch Digifant MP4.0

**VOLKSWAGEN**



Engine management

## Data link connector (DLC) locations



Above fascia relay plate

## Trouble codes

### General information

- ☐ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ☐ Carry out road test for at least 5 minutes.
- ☐ Briefly fully depress throttle pedal to increase engine speed over 3000 rpm.
- ☐ Allow to idle for 5 minutes.

### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

## Trouble code identification

Flash type 4-digit	Fault location	Probable cause
0000	End of test sequence	–
1111	Engine control module (ECM)	ECM
2212	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
2222 <sup>1</sup>	Manifold absolute pressure (MAP) sensor	Hose connection(s), ECM
2242	Mixture adjustment resistor	Wiring, mixture adjustment resistor
2312	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
2322	Intake air temperature (IAT) sensor	Wiring, IAT sensor
2341	Heated oxygen sensor (HO2S) – lambda control	ECM
2342	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative, fuel level low
4444	No fault found	–

<sup>1</sup> Incorporated in ECM.

VAG type 5-digit	Fault location	Probable cause
00000	No fault found	–
00518	Throttle position (TP) sensor	Wiring, poor connection, TP sensor
00519 <sup>1</sup>	Manifold absolute pressure (MAP) sensor	Hose connection(s), ECM
00522	Engine coolant temperature (ECT) sensor	Wiring, poor connection, ECT sensor
00523	Intake air temperature (IAT) sensor	Wiring, poor connection, IAT sensor
00525	Heated oxygen sensor (HO2S)	Wiring, HO2S, heating inoperative
00532	Engine control module (ECM) – supply voltage	Alternator, battery, wiring
01087	Engine control module (ECM) – basic setting	Basic setting not completed
65535	Engine control module (ECM) – defective	ECM

<sup>1</sup> Incorporated in ECM.



# VOLKSWAGEN

Model:

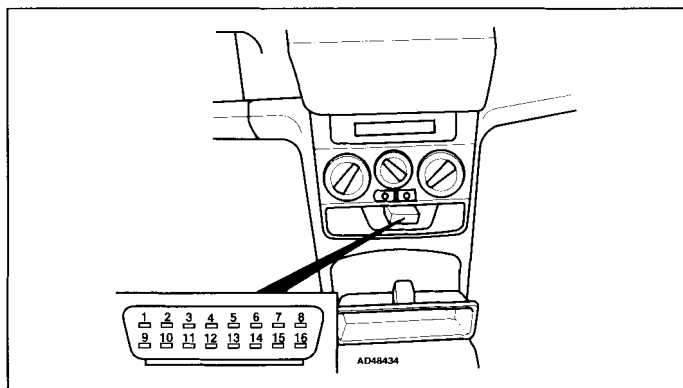
Lupo • Polo/Classic/Estate  
Golf/Vento/Bora/Cabrio • Beetle  
Passat (08/90 →) • Corrado  
Sharan • Transporter/Caravelle

Year:

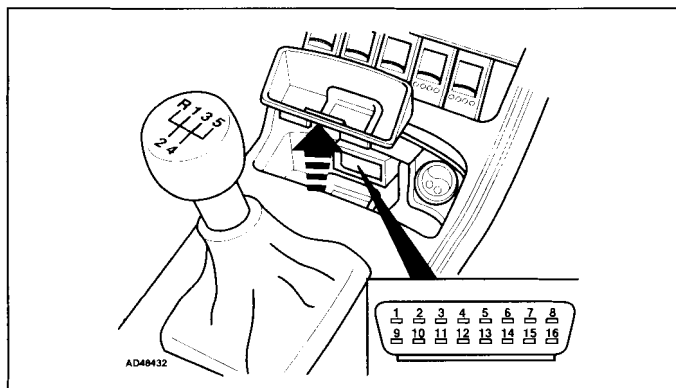
1990-02

Transmission

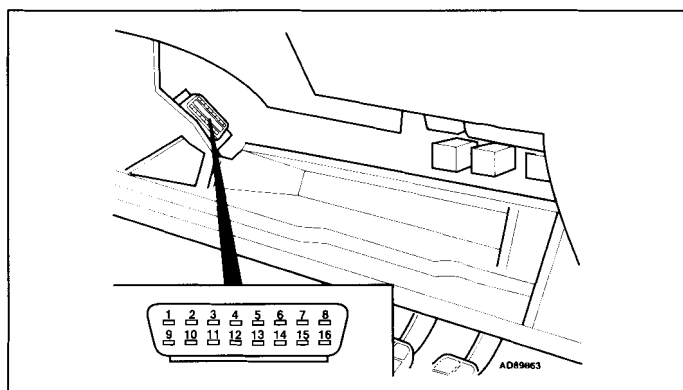
## Data link connector (DLC) locations



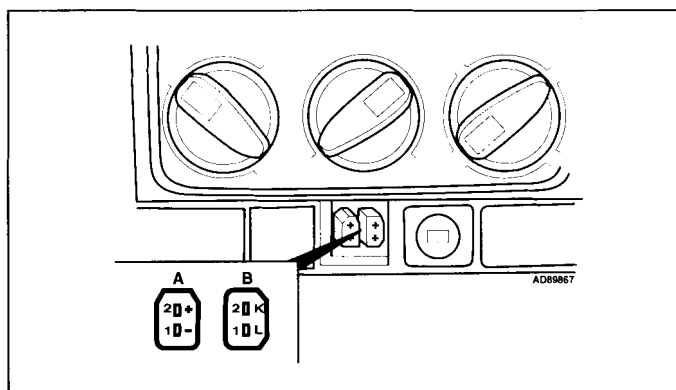
Lupo →04/00 – behind storage compartment



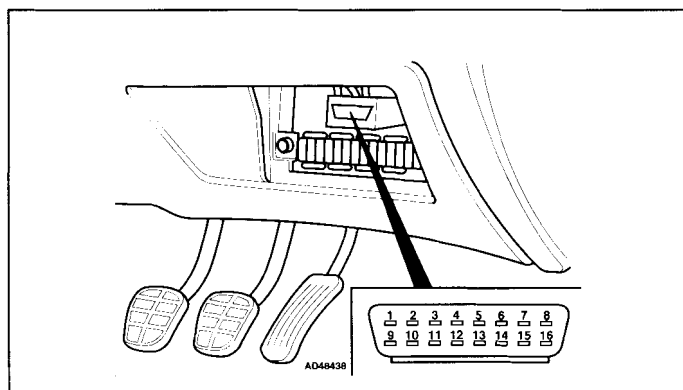
Lupo 05/00 →, Polo 10/99 →, Classic & Estate 1999 → – under front ashtray



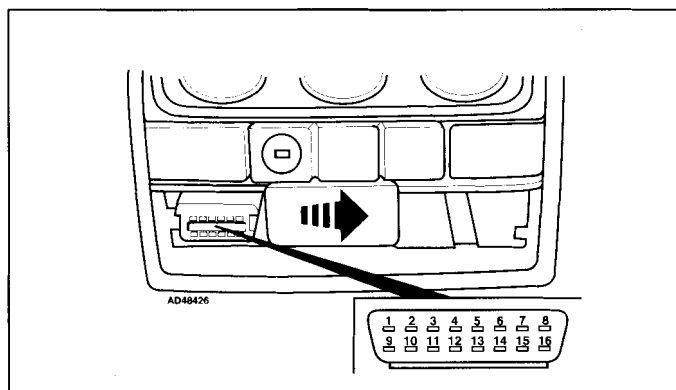
Polo →07/97, Classic & Estate →1999 – in glovebox, driver's side



Golf/Vento →07/93 – below heater controls



Polo 08/97-09/99 – in fascia fusebox



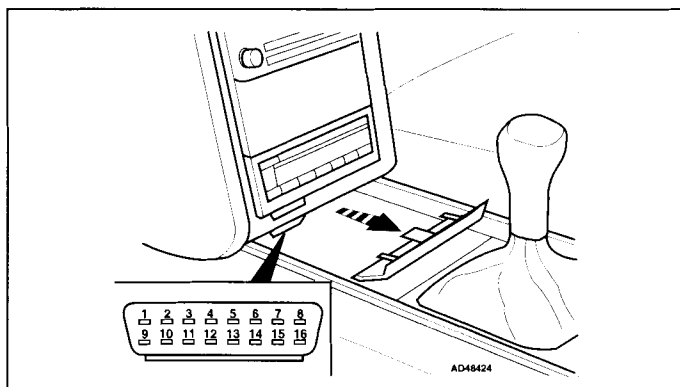
Golf 08/93-97, Vento 08/93-98, Cabrio – adjacent to ashtray

Model: Lupo • Polo/Classic/Estate • Golf/Vento/Bora/Cabrio • Beetle  
Passat (08/90 →) • Corrado • Sharan • Transporter/Caravelle

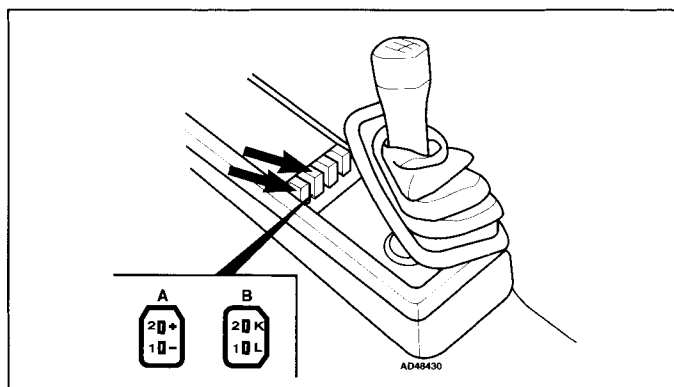
**VOLKSWAGEN**



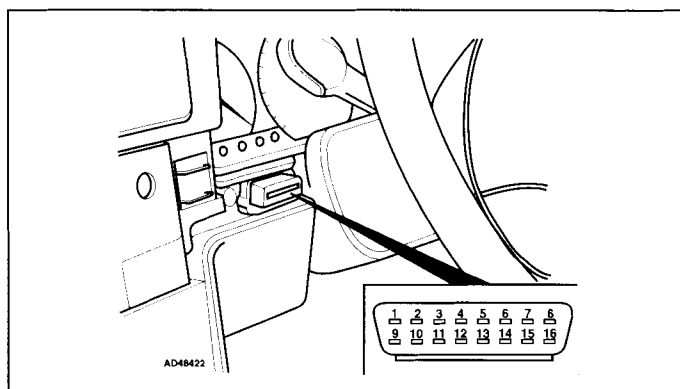
Transmission



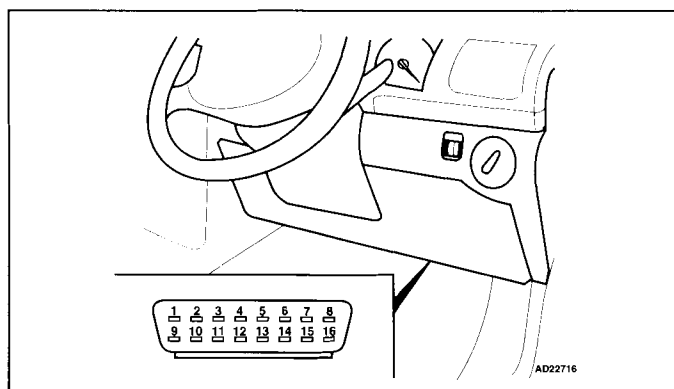
Golf 1997 →, Bora – centre console



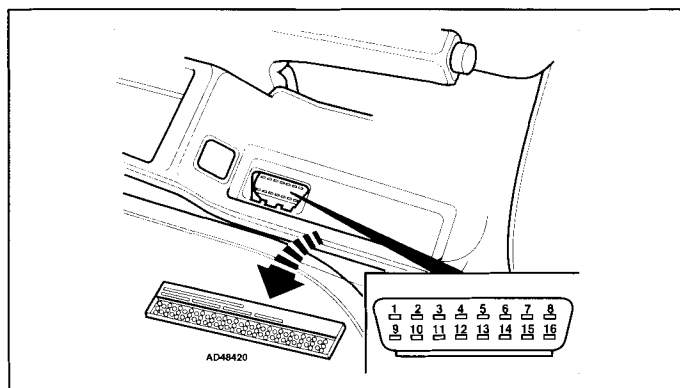
Passat →1993, Corrado →07/93 – centre console



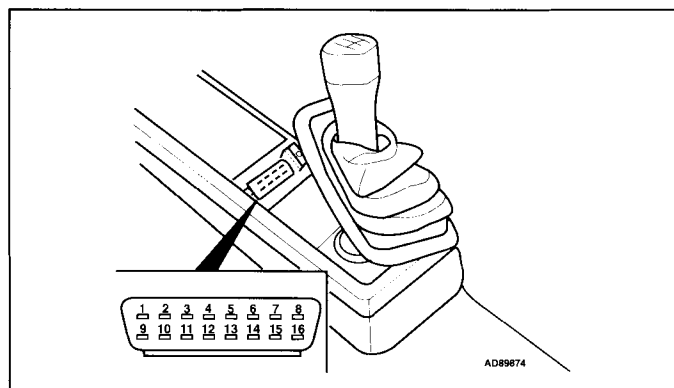
Passat 1994-96 – adjacent to steering column



Beetle, Passat 10/00 →, Sharan 06/00 → – fascia, driver's side



Passat 1996-09/00 – near handbrake, below rubber mat



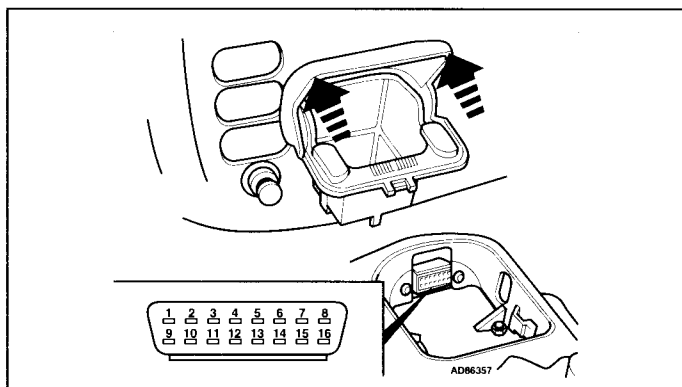
Corrado 08/93 → – centre console



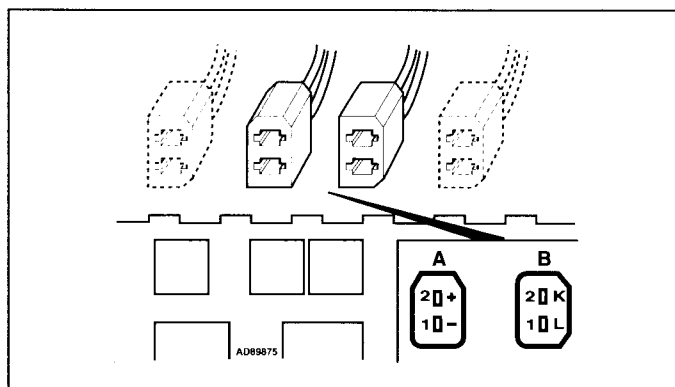
# VOLKSWAGEN

Model: Lupo • Polo/Classic/Estate • Golf/Vento/Bora/Cabrio • Beetle  
Passat (08/90 →) • Corrado • Sharan • Transporter/Caravelle

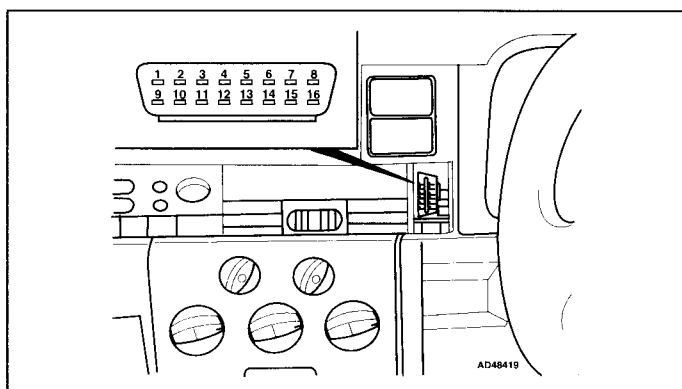
## Transmission



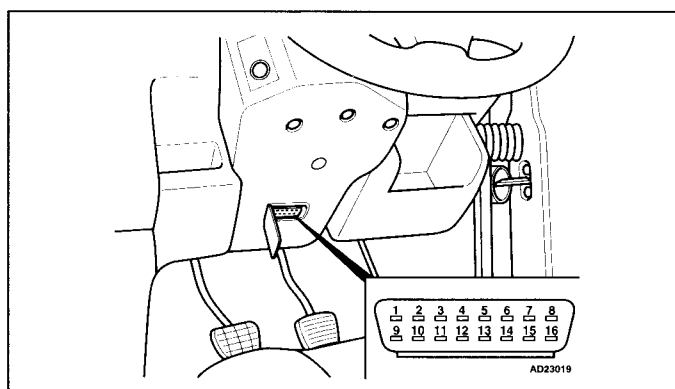
Sharan →05/00 – under front ashtray



Transporter/Caravelle →1995 – above fascia fusebox/relay plate



Transporter/Caravelle 1996-08/98 – adjacent to instrument panel



Transporter/Caravelle 09/98 → – fascia, driver's side

## Trouble codes

### 4motion – manual 5/6 speed 4WD

**NOTE:** Vehicle equipped with an electronically controlled Haldex coupling.

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The four wheel drive control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).



### Trouble code identification

VAG type	Fault location	Probable cause
00000	No fault found	—
00453	Haldex coupling – overheating	Mechanical fault
00526	Stop lamp switch	Wiring, stop lamp switch
00532	Four wheel drive control module – supply voltage	Alternator, battery, wiring
01043	Four wheel drive control module – programming	Incorrect four wheel drive control module
01155	Haldex coupling – mechanical fault	Mechanical fault
01312	CAN data bus – defective	Trouble code(s) stored in other system(s), wiring
01314	CAN data bus, ECM	Wiring, ECM trouble code(s) stored, ECM incorrectly coded, wiring
01316	CAN data bus, ABS	ABS control module trouble code(s) stored, wiring
65535	Four wheel drive control module – defective	Four wheel drive control module

### Automatic/Tiptronic

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Automatic transmission in 'P'.
- Data link connector (DLC) – 2-pin: (A) black, (B) brown/white.

#### Accessing and erasing

- The transmission control module (TCM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

VAG type	EOBD type	Fault location	Probable cause
—	P0	Refer to EOBD trouble code table	—
00000	—	No fault found	—
00258	—	Solenoid valve 1	Wiring, poor connection, transmission internal wiring, solenoid valve
00260	—	Solenoid valve 2	Wiring, poor connection, transmission internal wiring, solenoid valve
00262	—	Solenoid valve 3	Wiring, poor connection, transmission internal wiring, solenoid valve
00263	—	Transmission	Wiring, hydraulic fault, clutch/valve body
00264	—	Solenoid valve 4	Wiring, poor connection, transmission internal wiring, solenoid valve
00266	—	Solenoid valve 5	Wiring, poor connection, transmission internal wiring, solenoid valve
00268	—	Solenoid valve 6	Wiring, poor connection, transmission internal wiring, solenoid valve





# VOLKSWAGEN

Model: Lupo • Polo/Classic/Estate • Golf/Vento/Bora/Cabrio • Beetle  
Passat (08/90 →) • Corrado • Sharan • Transporter/Caravelle

## Transmission

VAG type	EOBD type	Fault location	Probable cause
00270	–	Solenoid valve 7	Wiring, poor connection, transmission internal wiring, solenoid valve
00281	–	Vehicle speed sensor (VSS)	Wiring, speedometer, insecure rotor, VSS
00283	–	ABS control module, LH front wheel speed signal – range/performance problem	Wiring, ABS trouble code(s) stored, incorrect ABS control module
00285	–	ABS control module, RH front wheel speed signal – range/performance problem	Wiring, ABS trouble code(s) stored, incorrect ABS control module
00287	–	ABS control module, RH rear wheel speed signal – range/performance problem	Wiring, ABS trouble code(s) stored, incorrect ABS control module
00290	–	ABS control module, LH rear wheel speed signal – range/performance problem	Wiring, ABS trouble code(s) stored, incorrect ABS control module
00293	–	Transmission range (TR) switch	Wiring, poor connection, TR switch
00296	–	Transmission kick-down switch	Wiring, accelerator cable adjustment, transmission kick-down switch, TP sensor
00297	–	Output shaft speed (OSS) sensor – no signal	Wiring, transmission speed sensor, multi-plugs for VSS and transmission speed sensor interchanged
00299	–	Transmission mode selection switch	Wiring, transmission mode selection switch
00300	–	Transmission fluid temperature (TFT) sensor	Wiring, poor connection, TFT sensor
00347	–	Solenoid valve 8	Wiring, poor connection, transmission internal wiring, solenoid valve
00348	–	Solenoid valve 9	Wiring, poor connection, transmission internal wiring, solenoid valve
00349	–	Solenoid valve 10	Wiring, poor connection, transmission internal wiring, solenoid valve
00350	–	Earth return wire, modulation valve	Wiring open circuit, TCM
00351	–	Transmission intermediate shaft speed sensor – no signal	Wiring open circuit, transmission intermediate shaft speed sensor
00518	–	Throttle position (TP) sensor	Wiring, signal from TP sensor or ECM, TP sensor
00526	–	Stop lamp switch	Wiring, stop lamp switch
00529	–	Engine RPM input – no signal	Wiring, ECM
00532	–	Transmission control module (TCM) – supply voltage	Alternator, battery, wiring
00543	–	Maximum engine RPM exceeded	Incorrect gear shift, CKP/RPM sensor, valve body, ECM
00545	–	ECM/TCM electrical connection – torque reduction signal	Wiring, ECM, TCM
00548	–	Transmission control module (TCM), fault memory – supply voltage, from battery	Fuse, supply voltage wiring, earth wiring
00549	–	ECM/TCM electrical connection – fuel consumption signal	Wiring, ECM, TCM
00596	–	Solenoid valves – short circuit	Poor connection, transmission internal wiring
00597	–	ABS control module, wheel speed signals – speed difference too great	Wiring, ABS trouble code(s) stored, incorrect ABS control module



VAG type	EOBD type	Fault location	Probable cause
00638 ■	–	Engine/gearbox electrical connection – TP sensor signal	Wiring, ECM, TCM
00638 ■2	–	Transmission control module (TCM) – supply voltage	Battery, alternator, wiring, TCM
00641	–	Transmission fluid temperature (TFT) sensor – high input	ATF level incorrect, towing weight limit exceeded, transmission internal wiring, TFT sensor
00652	–	Gear monitoring – implausible signal	Wiring, hydraulic fault, clutch/valve body
00660	–	Transmission kick-down switch/throttle position (TP) sensor – implausible signal	Wiring, accelerator cable adjustment, kick-down switch, TP sensor
00668	–	Transmission control module (TCM) – supply voltage, from battery	Wiring, fuse
00753	–	ABS control module, wheel speed signals – implausible	Wiring, ABS trouble code(s) stored, incorrect ABS control module
00777	–	CAN data bus, APP sensor – incorrect signal	Wiring, APP sensor signal from ECM, ECM trouble code(s) stored
00789	–	Reverse gear position switch	Wiring, reverse gear position switch, TR switch
01044	–	Transmission control module (TCM) – coding	Incorrectly coded
01045	–	Tiptronic gear selection switch – incorrect signal	Wiring, tiptronic gear selection switch
01166	–	Engine torque signal	Trouble codes 01312/01314 stored, ECM incorrectly coded, faulty engine/component(s), ECM
01192	–	Torque converter clutch (TCC) solenoid – mechanical fault	ATF level, clutch slipping, TCC solenoid, valve body defective
01196	–	CAN data bus, ECM/TCM	Ignition switched ON with TCM disconnected, wiring, ECM, TCM
01236	–	Selector lever lock solenoid	Wiring, selector lever lock solenoid
01312	–	CAN data bus – defective	Trouble code(s) stored in other system(s), wiring
01314	–	CAN data bus, ECM	Wiring, ECM trouble code(s) stored, ECM incorrectly coded, wiring
01316	–	CAN data bus, ABS	ABS control module trouble code(s) stored, wiring
16955	–	Stop lamp switch – range/performance problem	Wiring, stop lamp switch
16987	–	Transmission control module (TCM) – KAM error	TCM
16989	–	Transmission control module (TCM) – ROM error	TCM
17086	–	Transmission control module (TCM) – defective	TCM
17087	–	Stop lamp switch – circuit malfunction	Wiring, stop lamp switch, ECM, TCM
17090	–	Transmission range (TR) switch – range/performance problem	Wiring, TR sensor
17094	–	Transmission fluid temperature (TFT) sensor – circuit malfunction	Wiring, TFT sensor
17095	–	Transmission fluid temperature (TFT) sensor – range/performance problem	Wiring, TFT sensor
17096	–	Transmission fluid temperature (TFT) sensor – low input	Wiring, TFT sensor

**Transmission**

VAG type	EOBD type	Fault location	Probable cause
17097	–	Transmission fluid temperature (TFT) sensor – high input	Wiring, TFT sensor
17100	–	Input shaft speed (ISS) sensor/turbine shaft speed (TSS) sensor – range/performance problem	Wiring, shield wiring, transmission input shaft speed sensor, engine RPM signal, TR switch, ATF level, torque converter, clutches or brakes slipping, sticking solenoid valve
17101	–	Input shaft speed (ISS) sensor/turbine shaft speed (TSS) sensor – no signal	Wiring, shield wiring, transmission input shaft speed sensor, engine RPM signal, TR switch, ATF level, transmission speed sensor, torque converter, clutches or brakes slipping, sticking solenoid valve
17105	–	Output shaft speed (OSS) sensor – range/performance problem	Wiring, shield wiring, transmission speed sensor, ECM/TCM input signals incorrectly transmitted, ATF level, torque converter, clutches or brakes slipping, sticking solenoid valve
17106	–	Output shaft speed (OSS) sensor – no signal	Wiring, shield wiring, ECM/TCM input signals incorrectly transmitted, transmission speed sensor, ATF level, torque converter, clutches or brakes slipping, sticking solenoid valve
17110	–	Engine RPM input – range/performance problem	Wiring, CKP/RPM sensor, ECM, TCM
17114	–	Incorrect gear ratio	ATF level, torque converter, clutches or brakes slipping, sticking solenoid valve, wiring, transmission speed sensor, transmission input shaft speed sensor, TCM
17115	–	Gear 1 – incorrect ratio	Clutch slipping, solenoid valve, transmission speed sensor, transmission input shaft speed sensor, TCM
17116	–	Gear 2 – incorrect ratio	Clutch slipping, solenoid valve, transmission speed sensor, transmission input shaft speed sensor, TCM
17117	–	Gear 3 – incorrect ratio	Clutch slipping, solenoid valve, transmission speed sensor, transmission input shaft speed sensor, TCM
17118	–	Gear 4 – incorrect ratio	Clutch slipping, solenoid valve, transmission speed sensor, transmission input shaft speed sensor, TCM
17119	–	Gear 5 – incorrect ratio	Clutch slipping, solenoid valve, transmission speed sensor, transmission input shaft speed sensor, TCM
17125	–	Torque converter clutch (TCC) solenoid – performance or stuck off	ATF level, torque converter, wiring, TCC solenoid, torque converter pressure valve
17135	–	Shift solenoid (SS) A – performance or stuck off	Wiring open circuit/short to earth, poor connection, shift solenoid
17136	–	Shift solenoid (SS) A – stuck on	Wiring, poor connection, shift solenoid
17137	–	Shift solenoid (SS) A – electrical	Wiring, poor connection, solenoid valve
17140	–	Shift solenoid (SS) B – performance or stuck off	Wiring open circuit/short to earth, poor connection, shift solenoid
17141	–	Shift solenoid (SS) B – stuck on	Wiring, poor connection, shift solenoid
17142	–	Shift solenoid (SS) B – electrical	Wiring, poor connection, solenoid valve
17145	–	Shift solenoid (SS) C – performance or stuck off	Wiring open circuit/short to earth, poor connection, shift solenoid
17146	–	Shift solenoid (SS) C – stuck on	Wiring, poor connection, shift solenoid
17147	–	Shift solenoid (SS) C – electrical	Wiring, poor connection, solenoid valve
–	P0	Refer to EOBD trouble code table	–
17968	P1560	Maximum engine RPM exceeded	Incorrect gear shift, wiring open circuit, CKP/RPM sensor





VAG type	EOBD type	Fault location	Probable cause
–	P1625	CAN data bus, ECM/TCM	Ignition switched ON with TCM disconnected, wiring, ECM, TCM
18112	P1704	Transmission kick-down switch – short to earth	Wiring open circuit/short to earth, transmission kick-down switch
18141	P1733	Tiptronic gear selection switch, down shift – short to earth	Wiring short to earth, tiptronic gear selection switch
18147	P1739	Tiptronic gear selection switch, up shift – short to earth	Wiring short to earth, tiptronic gear selection switch
18152	P1744	Tiptronic gear selection switch, recognition – short to earth	Wiring short to earth, tiptronic gear selection switch
18153	P1745	Solenoid valves, supply voltage – short to positive	Wiring open circuit/short to positive, poor connection, TCM
–	P1746	Transmission control module (TCM) – supply voltage	Alternator, battery, wiring
18155	P1747	Solenoid valves, supply voltage – open circuit/short to earth	Battery, wiring open circuit/short to earth, poor connection, TCM
18156	P1748	Transmission control module (TCM) – defective	TCM
18157	P1749	Transmission control module (TCM) – coding	Incorrectly coded, ECM incorrectly coded, TCM
18158	P1750	Transmission control module (TCM) – supply voltage low	Fuse, wiring, TCM
18159	P1751	Transmission control module (TCM) – supply voltage high	Alternator, second battery incorrectly connected
18160	P1752	Transmission control module (TCM) – supply voltage	Wiring, alternator
–	P1760	Selector lever lock solenoid	Wiring, selector lever lock solenoid
18169	P1761	Selector lever lock solenoid – short to earth	Wiring short to earth, selector lever lock solenoid, tiptronic gear selection switch, TCM
18170	P1762	Selector lever lock solenoid – short to positive	Wiring short to positive, selector lever lock solenoid, tiptronic gear selection switch, TCM
18171	P1763	Selector lever lock solenoid – open circuit	Wiring open circuit, selector lever lock solenoid, TCM
–	P1767	ECM/TCM electrical connection – TP sensor signal	Wiring, ECM, TCM
18179	P1771	Engine control module (ECM), load signal – open circuit/short to positive	Wiring open circuit/short to positive, ECM
18180	P1772	Engine control module (ECM), load signal – short to earth	Wiring short to earth, ECM
–	P1781	ECM/TCM electrical connection, torque reduction signal – open circuit/short to earth	Wiring open circuit/short to earth, ECM, TCM
–	P1782	ECM/TCM electrical connection, torque reduction signal – short to positive	Wiring short to positive, ECM, TCM
18192	P1784	Engine control module (ECM), up/down shift signal – open circuit/short to earth	Wiring open circuit/short to earth, ECM
18193	P1785	Engine control module (ECM), up/down shift signal – short to positive	Wiring open circuit/short to positive, ECM
18108	–	Brake pressure switch – incorrect signal	Wiring, brake pressure switch

**VOLKSWAGEN**Model: Lupo • Polo/Classic/Estate • Golf/Vento/Bora/Cabrio • Beetle  
Passat (08/90 →) • Corrado • Sharan • Transporter/Caravelle**Transmission**

VAG type	EOBD type	Fault location	Probable cause
–	P1813	Solenoid valve 4	Wiring, poor connection, transmission internal wiring, solenoid valve
18222	P1814	Pressure control (PC) solenoid 1 – open circuit/short to earth	Wiring open circuit/short to earth, PC solenoid
18223	P1815	Pressure control (PC) solenoid 1 – short to positive	Wiring short to positive, PC solenoid
–	P1818	Solenoid valve 5	Wiring, poor connection, transmission internal wiring, solenoid valve
18227	P1819	Pressure control (PC) solenoid 2 – open circuit/short to earth	Wiring open circuit/short to earth, PC solenoid
18228	P1820	Pressure control (PC) solenoid 2 – short to positive	Wiring short to positive, PC solenoid
–	P1823	Solenoid valve 6	Wiring, poor connection, transmission internal wiring, solenoid valve
18232	P1824	Pressure control (PC) solenoid 3 – open circuit/short to earth	Wiring open circuit/short to earth, PC solenoid
18233	P1825	Pressure control (PC) solenoid 3 – short to positive	Wiring short to positive, PC solenoid
–	P1828	Solenoid valve 7	Wiring, poor connection, transmission internal wiring, solenoid valve
18237	P1829	Pressure control (PC) solenoid 4 – open circuit/short to earth	Wiring open circuit/short to earth, PC solenoid
18238	P1830	Pressure control (PC) solenoid 4 – short to positive	Wiring short to positive, PC solenoid
18242	P1834	Pressure control (PC) solenoid 5 – open circuit/short to earth	Wiring open circuit/short to earth, PC solenoid
18243	P1835	Pressure control (PC) solenoid 5 – short to positive	Wiring short to positive, PC solenoid
18249	P1841	Engine control module (ECM)/transmission control module (TCM) – incorrectly matched	Incorrect ECM/TCM
18258	P1850	CAN data bus, ECM – missing information	Ignition switched ON with TCM disconnected, wiring, TCM
18259	P1851	CAN data bus, ABS – missing information	Ignition switched ON with TCM disconnected, wiring, TCM, ABS control module, ECM
18262	P1854	CAN data bus – defective	Wiring, ECM, TCM
18263	P1855	CAN data bus – software	Ignition switched ON with TCM disconnected, ECM, TCM
18264	P1856	Engine control module (ECM) – TP sensor signal	Wiring, ECM, TCM
18265	P1857	Engine control module (ECM) – load signal	ECM, TCM
18266	P1858	Engine control module (ECM) – RPM signal	Wiring, CKP/RPM sensor, ECM, TCM
18269	P1861	Engine control module (ECM) – APP sensor signal	Wiring, APP sensor, ECM, TCM
65535	–	Transmission control module (TCM) – defective	Mechanical/hydraulic fault, electrical/electronic component, wiring, TCM

1 Except Passat 5 speed/4WD.

2 Passat 5 speed/4WD.



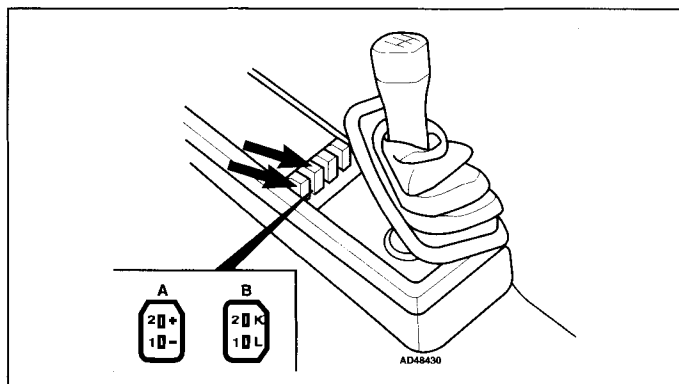
Model: Passat 1,8/2,0 16V  
 Year: 1989-07/90  
 System: Digimat II

**VOLKSWAGEN**



Transmission

## Data link connector (DLC) locations



Centre console

## Trouble codes

### General information

- ☐ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ☐ Self-diagnosis using flash type trouble codes may not display all available diagnostic information.
- ☐ Automatic transmission in 'N'.

### Accessing

- The transmission control module (TCM) fault memory can only be accessed using diagnostic equipment connected to the data link connector (DLC).

### Erasing

- Ensure ignition switched OFF.
- Disconnect TCM multi-plug or battery earth lead.
- Diagnostic equipment can also be used to erase data from TCM fault memory.

**WARNING:** Disconnecting the battery may erase memory from electronic units (e.g. radio, clock).

### Trouble code identification

Flash type 4-digit	Fault location	Probable cause
1111	Transmission control module (TCM) – defective	Electrical interference, mechanical/hydraulic fault, electrical/electronic component, wiring, TCM
1113	Shift solenoid (SS) 1	Wiring, poor connection, transmission internal wiring, SS
1121	Shift solenoid (SS) 2	Wiring, poor connection, transmission internal wiring, SS
1123	Shift solenoid (SS) 3	Wiring, poor connection, transmission internal wiring, SS
1124	Transmission	Wiring, hydraulic fault, clutch/valve body
1131	Torque converter clutch (TCC) solenoid	Wiring, poor connection, transmission internal wiring, TCC solenoid
1133	Shift control solenoid 1	Wiring, poor connection, transmission internal wiring, shift control solenoid
1141	Transmission fluid pressure (TFP) solenoid	Wiring, poor connection, transmission internal wiring, TFP solenoid



**Transmission**

Flash type 4-digit	Fault location	Probable cause
1143	Shift control solenoid 2	Wiring, poor connection, transmission internal wiring, shift control solenoid
1231	Vehicle speed sensor (VSS)	Wiring, speedometer, insecure rotor, VSS
1314	Transmission range (TR) switch	Wiring, poor connection, TR switch
1323	Transmission kick-down switch	Wiring, accelerator cable adjustment, transmission kick-down switch, TP sensor
1332	Transmission mode selection switch	Wiring, transmission mode selection switch
1333	Transmission fluid temperature (TFT) sensor	Wiring, poor connection, TFT sensor
2122	Engine RPM signal missing	Wiring, ECM
2131	Stop lamp switch	Wiring, stop lamp switch
2212	Throttle position (TP) sensor	Wiring, TP sensor
2234	Transmission control module (TCM) – supply voltage	Alternator, battery, wiring
2314	Engine/gearbox electrical connection – ignition timing adjustment	Wiring, ECM, TCM
4314	Selector lever lock solenoid	Wiring, selector lever lock solenoid
4444	No fault found	–

VAG type 5-digit	Fault location	Probable cause
00000	No fault found	–
00258	Shift solenoid (SS) 1	Wiring, poor connection, transmission internal wiring, SS
00260	Shift solenoid (SS) 2	Wiring, poor connection, transmission internal wiring, SS
00262	Shift solenoid (SS) 3	Wiring, poor connection, transmission internal wiring, SS
00263	Transmission	Wiring, hydraulic fault, clutch/valve body
00264	Torque converter clutch (TCC) solenoid	Wiring, poor connection, transmission internal wiring, TCC solenoid
00266	Shift control solenoid 1	Wiring, poor connection, transmission internal wiring, shift control solenoid
00268	Transmission fluid pressure (TFP) solenoid	Wiring, poor connection, transmission internal wiring, TFP solenoid
00270	Shift control solenoid 2	Wiring, poor connection, transmission internal wiring, shift control solenoid
00281	Vehicle speed sensor (VSS)	Wiring, speedometer, insecure rotor, VSS
00293	Transmission range (TR) switch	Wiring, poor connection, TR switch
00296	Transmission kick-down switch	Wiring, accelerator cable adjustment, transmission kick-down switch, TP sensor
00299	Transmission mode selection switch	Wiring, transmission mode selection switch
00300	Transmission fluid temperature (TFT) sensor	Wiring, poor connection, TFT sensor
00518	Throttle position (TP) sensor	Wiring, TP sensor
00526	Stop lamp switch	Wiring, stop lamp switch
00529	Engine RPM signal missing	Wiring, ECM
00532	Transmission control module (TCM) – supply voltage	Alternator, battery, wiring



VAG type 5-digit	Fault location	Probable cause
00545	Engine/gearbox electrical connection – ignition timing adjustment	Wiring, ECM, TCM
00596	Solenoid valves – short circuit	Poor connection, transmission internal wiring
00638	Engine/gearbox electrical connection – TP sensor signal	Wiring, ECM, TCM
00641	Transmission fluid temperature (TFT) sensor – high input	ATF level incorrect, towing weight limit exceeded, transmission internal wiring, TFT sensor
00652	Gear shift – implausible signal	Wiring, hydraulic fault, clutch/valve body
00660	Transmission kick-down switch/throttle position (TP) sensor – implausible signal	Wiring, accelerator cable adjustment, kick-down switch, TP sensor
01236	Selector lever lock solenoid	Wiring, selector lever lock solenoid
65535	Transmission control module (TCM) – defective	Electrical interference, mechanical/hydraulic fault, electrical/electronic component, wiring, TCM





# VOLKSWAGEN

Model:

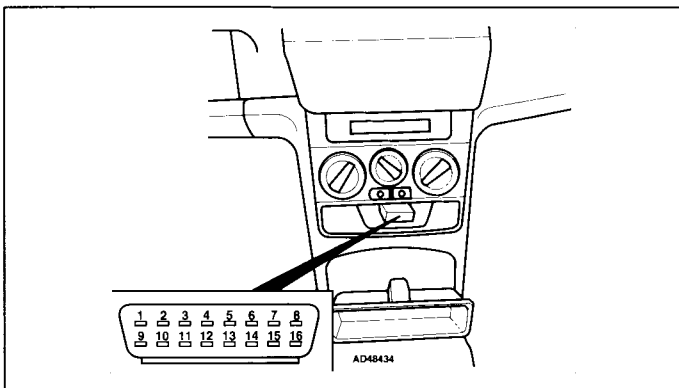
Lupo • Polo/Classic/Estate  
Golf/Vento/Bora/Cabrio (10/94 →) • Beetle  
Passat • Corrado (10/94-95) • Sharan  
Caddy/Pickup • Transporter/Caravelle • LT

Year:

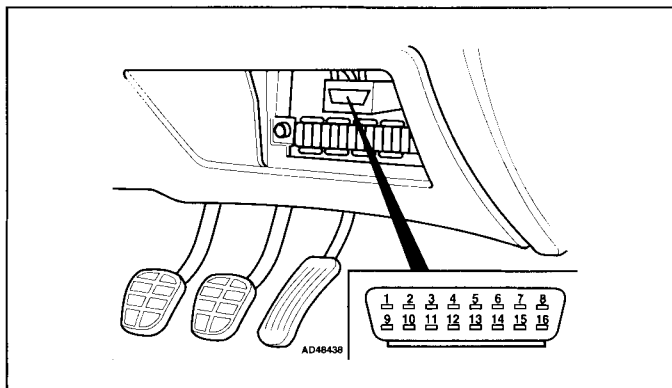
1994-02

Immobilizer

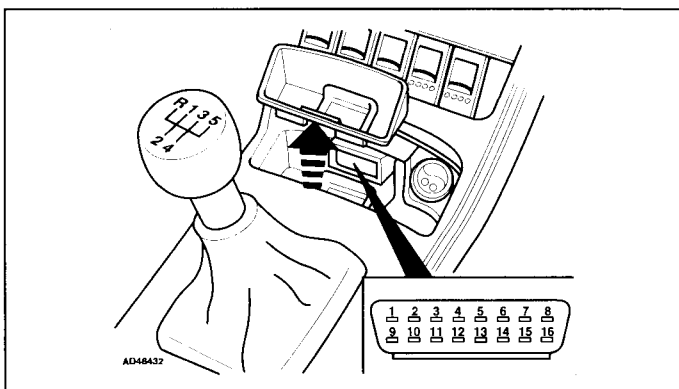
## Data link connector (DLC) locations



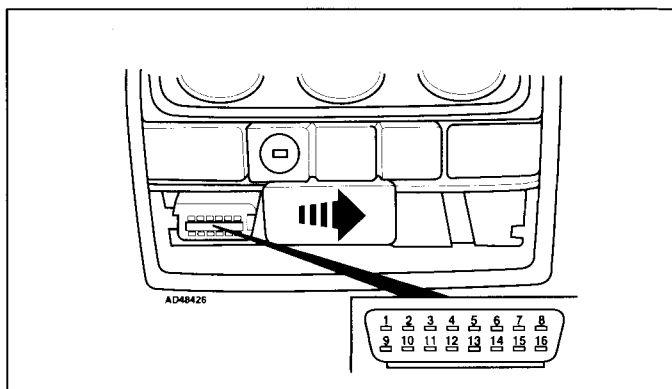
Lupo →04/00 (except 1,2 TDI) – behind storage compartment



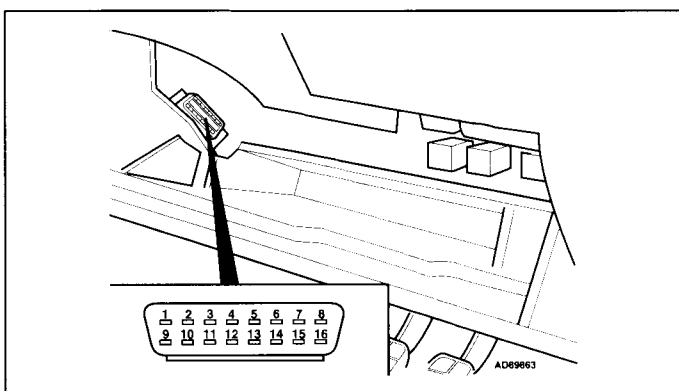
Polo 08/97-09/99 – in fascia fusebox



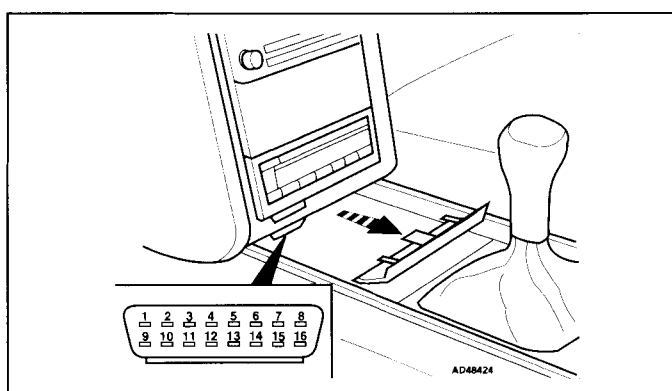
Lupo 05/00 → (& 1,2 TDI), Polo 10/99 →, Classic & Estate 1999 → – under front ashtray



Golf →1997, Vento, Cabrio – adjacent to ashtray



Polo →07/97, Classic & Estate →1999, Caddy – in glovebox, driver's side



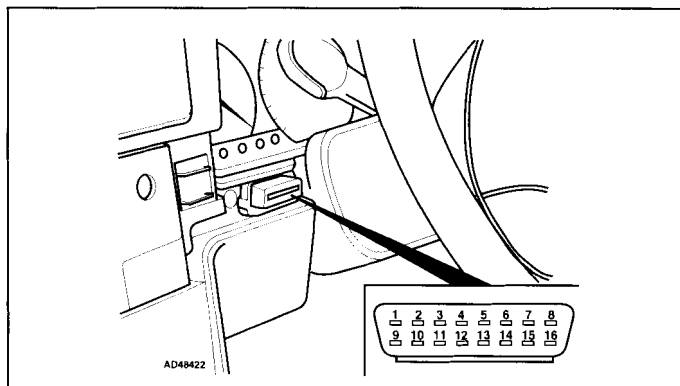
Golf 1997 →, Bora – centre console

Model: Lupo • Polo/Classic/Estate • Golf/Vento/Bora/Cabrio (10/94 →)  
 Beetle • Passat • Corrado (10/94-95) • Sharan  
 Caddy/Pickup • Transporter/Caravelle • LT

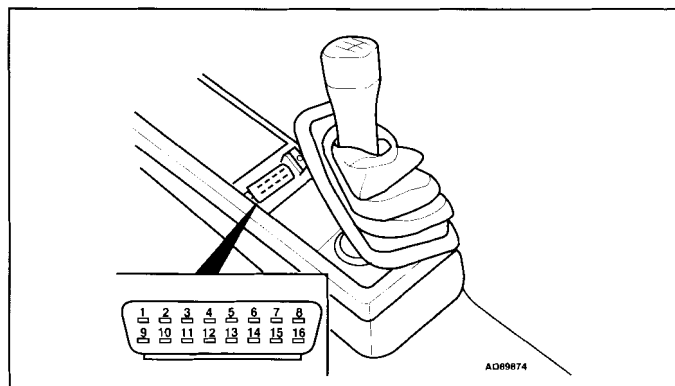
**VOLKSWAGEN**



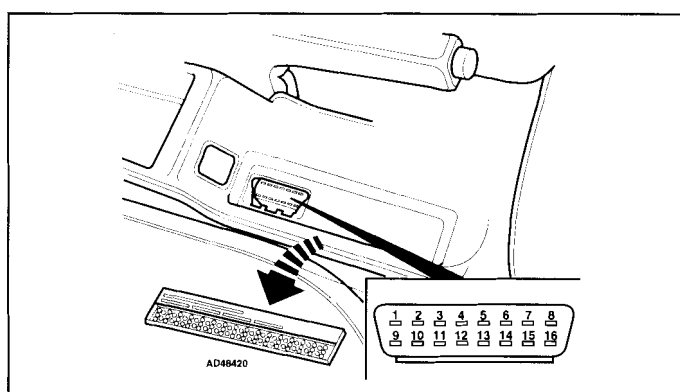
Immobilizer



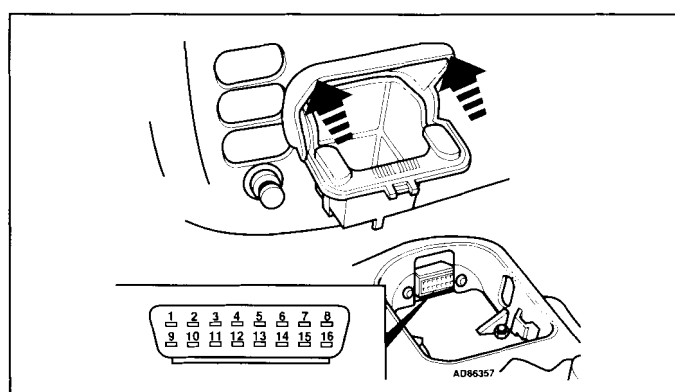
Passat →1996 – adjacent to steering column



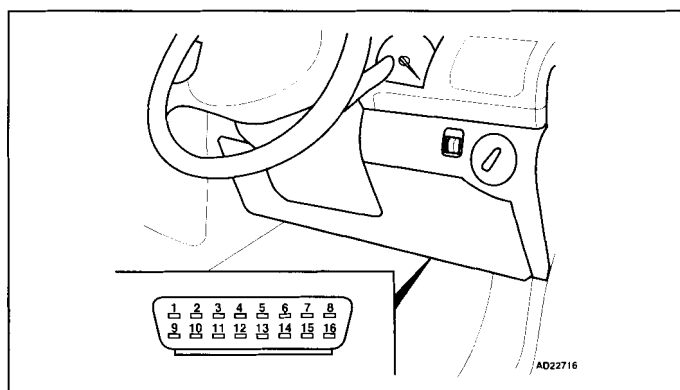
Corrado – near gear lever



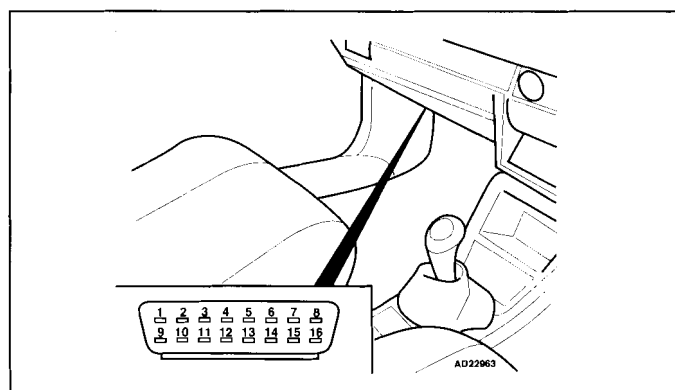
Passat 1996-09/00 – near handbrake, below rubber mat



Sharan →05/00 – centre console



Beetle, Passat 10/00 →, Sharan 06/00 → – fascia, driver's side



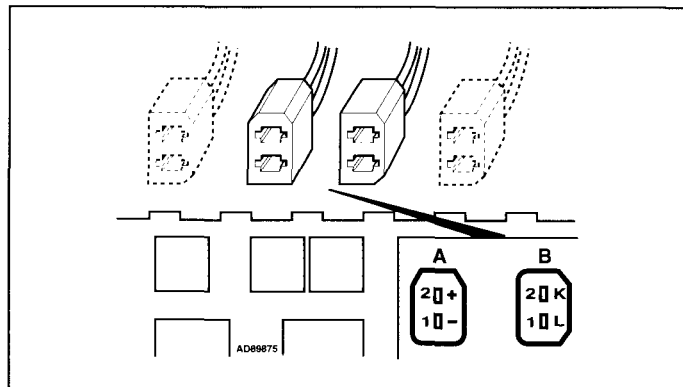
Caddy Pickup – fascia, passenger's side



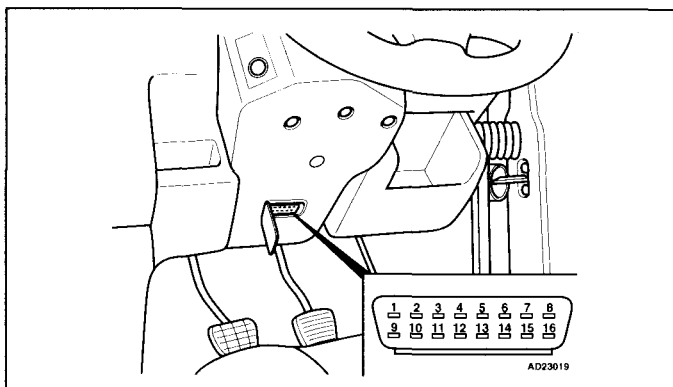
# VOLKSWAGEN

Model: Lupo • Polo/Classic/Estate • Golf/Vento/Bora/Cabrio (10/94 →)  
Beetle • Passat • Corrado (10/94-95) • Sharan  
Caddy/Pickup • Transporter/Caravelle • LT

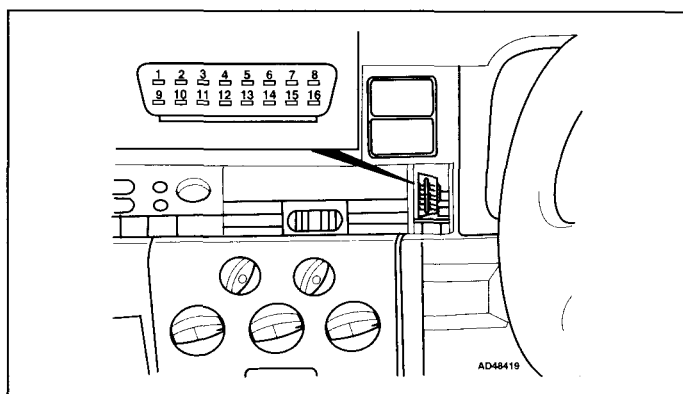
## Immobilizer



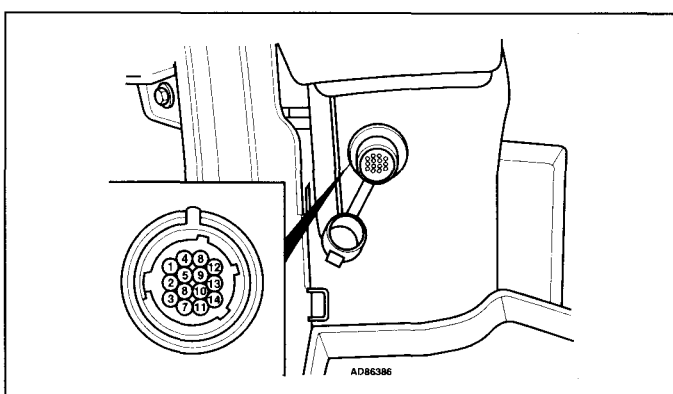
Transporter/Caravelle →1995 – above fascia fusebox/relay plate



Transporter/Caravelle 09/98 → – fascia, driver's side



Transporter/Caravelle 1996-08/98 – adjacent to instrument panel



LT – fascia

## Trouble codes

### General information

- ❑ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ❑ System malfunction: Engine runs for approximately 1 second and then cuts out.
- ❑ Data link connector (DLC) – 2-pin: (A) black, (B) brown/white.

### Accessing and erasing

- The immobilizer control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).



Model: Lupo • Polo/Classic/Estate • Golf/Vento/Bora/Cabrio (10/94 →)  
Beetle • Passat • Corrado (10/94-95) • Sharan  
Caddy/Pickup • Transporter/Caravelle • LT

**VOLKSWAGEN**



Immobilizer

### Trouble code identification

VAG type	Fault location	Probable cause
00000	No fault found	—
00546	Immobilizer control module, data wire – implausible authorisation signal	Wiring, incorrectly coded, ignition switched OFF/ON too quickly, immobilizer control module
00750	Immobilizer warning lamp	Wiring, immobilizer warning lamp
01128	Immobilizer read coil	Wiring, immobilizer read coil, immobilizer control module
01176	Ignition key – incorrect signal	Ignition key not matched/damaged, poor connection, wiring, immobilizer read coil
01177	Engine control module (ECM)/fuel shut-off solenoid control module – not authorised	ECM/fuel shut-off solenoid control module not matched to immobilizer control module
01179	Ignition key programming – incorrectly matched	Malfunction during ignition key programming
01181	Ignition key programming – initial matching	Stored value for quantity of keys to be programmed exceeded, erase and re-check fault memory
01202	Data link connector (DLC)	Wiring short circuit, immobilizer control module
01237	Fuel shut-off solenoid	Fuel shut-off solenoid control module, fuel shut-off solenoid
01312	CAN data bus – defective	Immobilizer control module incorrectly coded, trouble code(s) stored in other system(s), wiring
01314	CAN data bus, ECM	Wiring, ECM trouble code(s) stored, ECM incorrectly coded, wiring
01354	CAN data bus – authorisation signal	Wiring, immobilizer control module
65535	Immobilizer control module – defective	DLC wiring, immobilizer control module



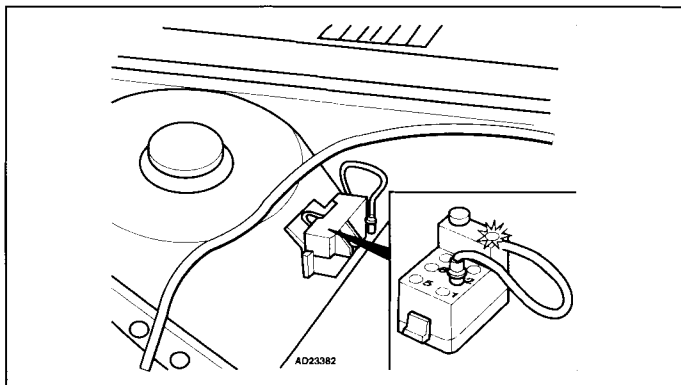


# VOLVO

Model: 440/460/480 1,6/1,7/1,8/2,0  
 Year: 1990-97  
 Engine code: B16F, B18EP, B18FP, B18U, B20F  
 System: Fenix 3B

## Engine management

### Data link connector (DLC) locations



Engine bay, LH

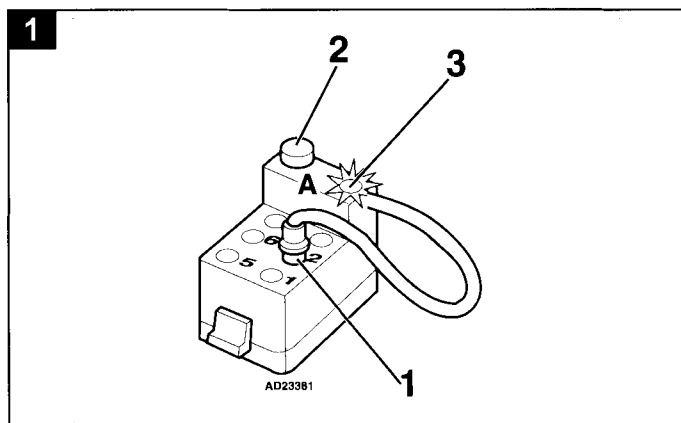
### Trouble codes

#### General information

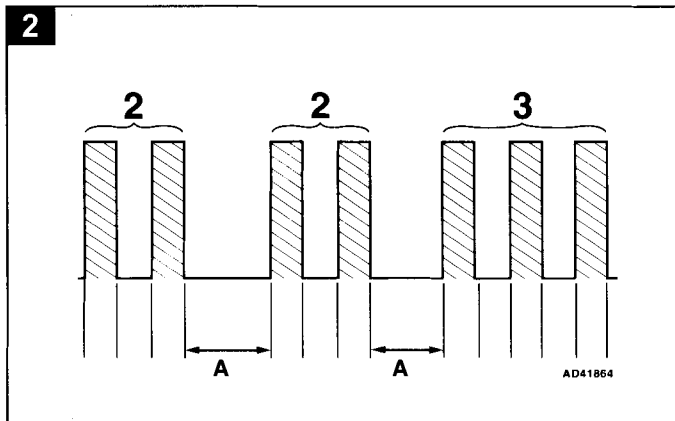
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the LED on the data link connector (DLC).

#### Accessing

- Open data link connector (DLC) cover.
- Insert system selector cable in socket 2 **1** [1].
- Switch ignition ON.
- Press test button for 0,5 to 1 second **1** [2].
- Count LED flashes **1** [3].
- Note trouble codes. Compare with trouble code table.
- Trouble codes consist of a sequence of three groups of flashes **2**.
- A 3 second pause separates each group **2** [A].
- For example: Trouble code 223 displayed **2**.



2



#### Erasing

**NOTE:** *Trouble codes must be accessed and faults rectified before codes can be erased.*

- Open data link connector (DLC) cover.
- Insert system selector cable in socket 2 **1** [1].
- Switch ignition ON.
- Press test button for 5 seconds minimum **1** [2].
- Release button. Wait until LED illuminates **1** [3].
- Press test button for 5 seconds minimum.
- Ensure trouble codes have been erased.
- The ECM fault memory can also be erased by disconnecting the battery.

**WARNING:** *Disconnecting battery may erase memory from electronic units (e.g. radio, clock).*

**Trouble code identification**

Flash type	Fault location	Probable cause
111	No fault found	–
112	Engine control module (ECM)	ECM
113	Injector(s) – faulty signal	Wiring open circuit
121	Manifold absolute pressure (MAP) sensor – signal error	Wiring, vacuum hose blocked/split, MAP sensor
122	Intake air temperature (IAT) sensor – signal error	Wiring, IAT sensor
123	Engine coolant temperature (ECT) sensor – signal error	Wiring, ECT sensor
132	Battery voltage	Wiring, engine control relay, alternator, battery
143	Knock sensor (KS) – signal error/signal absent	Wiring, KS
211	Mixture adjustment resistor – B18EP	Wiring open/short circuit, mixture adjustment resistor
212	Heated oxygen sensor (HO2S) – signal error/signal absent	Wiring, fuses, oxygen sensor heater, injector(s), fuel pressure
214	Crankshaft position (CKP) sensor – early models	Wiring, CKP sensor
222	Engine control relay – no voltage to ECM pin 20	Wiring, engine control relay, ECM
223	Idle air control (IAC) valve, MPI – signal error/signal absent	Wiring short/open circuit
223	Idle speed control (ISC) actuator, TBI – signal error/signal absent	Wiring short/open circuit
231	Heated oxygen sensor (HO2S) – signal error, part load range	Wiring, fuses, oxygen sensor heater, injector(s), fuel pressure
232	Heated oxygen sensor (HO2S) – signal error, idling	Wiring, fuses, oxygen sensor heater, injector(s), fuel pressure
243	Throttle position (TP) sensor – signal error	Wiring, accelerator cable adjustment, TP sensor, ECM
244	Knock sensor (KS) – ignition control limit reached	Wiring, KS, fuel quality, combustion fault
311	Vehicle speed sensor (VSS)	Wiring, VSS
411	Throttle position (TP) sensor – signal error	Wiring, accelerator cable adjustment, TP sensor, ECM
412	Throttle position (TP) sensor – signal to multi-function control module	Wiring, TP sensor, ECM





# VOLVO

Model: S/V40 1,6/1,8/1,9/2,0 • S/V40 1,9 TD • 850 2,0/2,3/2,5/Turbo • 850/S/V70 2,5 TDI (→08/98)  
S/V/C70 2,0/2,3/2,5/Turbo • 960 2,5/3,0 • S/V90 2,9

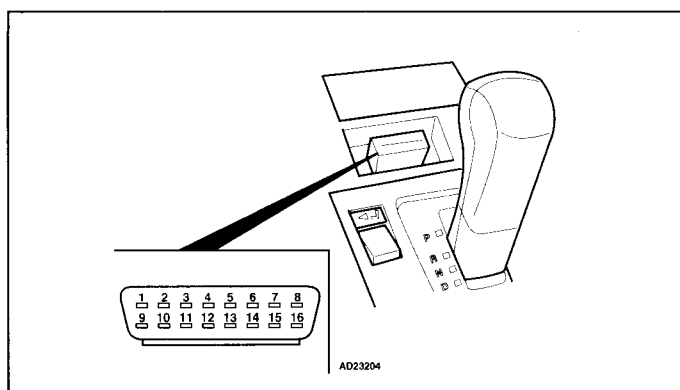
Year: 1995-99

Engine code: B4164S, B4184S, B4184SM, B4194T, B4204S, B4204T, B5204T/T2/T3, B5234FS, B5234T/T2/T3/T4/T6/T7, B5254S, B5254T, B6254F, B6254S, B6304F/S, B6304S1/2, D4192T, D5252T

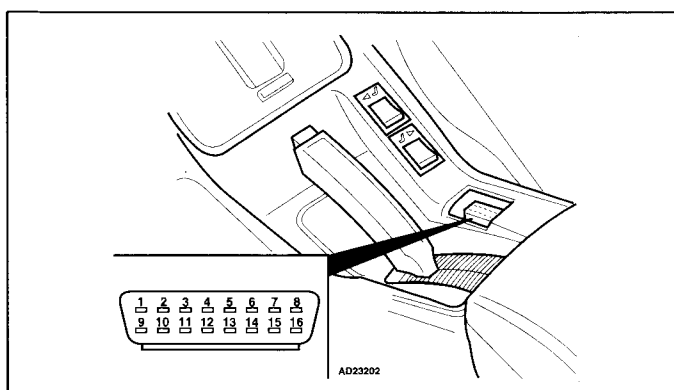
System: Bosch Motronic 4.4 • Bosch MSA 15.7 • Lucas DPI-N • Melco 1 • Siemens EMS 2000  
Siemens Fenix 5.1

## Engine management

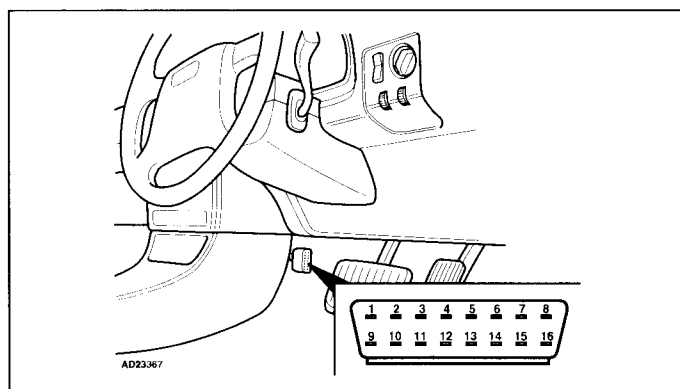
### Data link connector (DLC) locations



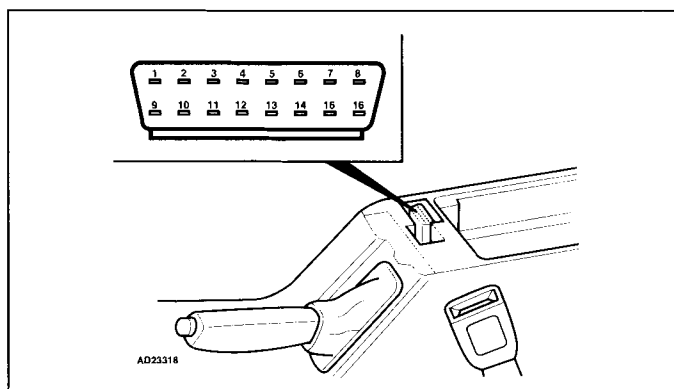
850 – near gear lever



960 – centre console



S/V40 – under fascia, driver's side



S/V/C70 – centre console

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).



## Trouble code identification

Scanner type	Fault location	Probable cause
EFI-0011	Heated oxygen sensor (HO2S)	Wiring, HO2S
EFI-0012	Mass air flow (MAF) sensor	Wiring, MAF sensor
EFI-0013	Intake air temperature (IAT) sensor	Wiring, IAT sensor
EFI-0014	Throttle position (TP) sensor	Wiring, TP sensor, IAC valve signal exceeded 2 V for 4 seconds
EFI-0021	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
EFI-0022	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Wiring, poor connection, CKP/RPM sensor
EFI-0023	Camshaft position (CMP) sensor	Wiring, poor connection, CMP sensor
EFI-0024	Speedometer	Wiring, speedometer
EFI-0025	Barometric pressure (BARO) sensor	Wiring, BARO sensor
EFI-0031	Knock sensor (KS)	Wiring, KS
EFI-0036	Engine control module (ECM) – ignition adjustment signal	Activation of ignition adjustment incomplete
EFI-0041	Injectors	Wiring, injector(s), injector control module
EFI-0044	Ignition coil	Spark plug(s), wiring, ignition coil
EFI-0054	Immobilizer control module – communication error	Wiring
EFI-0056	Fuel pressure sensor	Wiring, fuel pressure sensor
EFI-0058	Fuel trim (FT) – abnormal intake air volume	Wiring, IAC valve, intake air by-pass valve
EFI-0064	Alternator	Wiring, alternator
EFI-0066	Brake vacuum sensor	Wiring, brake vacuum sensor
EFI-0089	Fuel trim (FT) – high/low	Intake leak/blockage, fuel pressure/pump, wiring, IAT sensor, BARO sensor, MAF sensor
EFI-112	Engine control module (ECM)	ECM
EFI-115	Injector 1	Wiring, injector
EFI-116	Engine control module (ECM) – internal fault	ECM
EFI-121	Mass air flow (MAF) sensor/manifold absolute pressure (MAP) sensor	Intake leak/blockage, hose leak, wiring, MAF/MAP sensor
EFI-122	Intake air temperature (IAT) sensor	Wiring, IAT sensor
EFI-123	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
EFI-125	Injector 2	Wiring, injector
EFI-131	Motronic 4.4: Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no signal	Wiring, CKP/RPM sensor
	EMS 2000/diesel: Crankshaft position (CKP) sensor/engine speed (RPM) sensor – no/incorrect signal	Wiring, poor connection, flywheel/drive plate damaged, CKP/RPM sensor
EFI-132	Engine control module (ECM) – supply voltage	Battery, alternator, wiring
EFI-137	Crankshaft position (CKP) sensor/engine speed (RPM) sensor	Wiring, flywheel/drive plate damaged, CKP/RPM sensor insecure/defective
EFI-135	Injector 3	Wiring, injector
EFI-143	Knock sensor (KS) 1	Wiring, KS
EFI-145	Injector 4	Wiring, injector
EFI-153	Heated oxygen sensor (HO2S) 2	Exhaust leak, wiring, HO2S 1/2
EFI-155	Injector 5	Wiring, injector

**VOLVO**

Model: S/V40 1,6/1,8/1,9/2,0 • S/V40 1,9 TD • 850 2,0/2,3/2,5/Turbo  
 850/S/V70 2,5 TDI (→08/98) • S/V/C70 2,0/2,3/2,5/Turbo  
 960 2,5/3,0 • S/V/90 2,9

**Engine management**

Scanner type	Fault location	Probable cause
EFI-165	Injector 6	Wiring, injector
EFI-211	Mixture adjustment resistor	Wiring, mixture adjustment resistor incorrectly adjusted/defective
EFI-212	Heated oxygen sensor (HO2S) 1	Wiring, HO2S 1/2
EFI-214	Crankshaft position (CKP) sensor/engine speed (RPM) sensor – incorrect/intermittent signal	Poor connection, shield wiring, flywheel/drive plate damaged, CKP/RPM sensor
EFI-216	Heated oxygen sensor (HO2S)	Wiring, HO2S
EFI-222	Engine control relay	Wiring, engine control relay
EFI-223	Idle air control (IAC) valve – opening signal	Wiring, IAC valve
EFI-225	AC refrigerant pressure sensor	Wiring, AC refrigerant pressure sensor
EFI-226	Idle air control (IAC) valve	Wiring, IAC valve
EFI-227	Idle speed control (ISC) valve	Wiring, ISC valve
EFI-231	Long term fuel trim, part load	Intake/exhaust leak, fuel pressure, excessive fuel in engine oil, engine oil level too high, injector(s), EVAP canister purge valve, wiring, MAF sensor, ECT sensor, HO2S
EFI-232	Long term fuel trim, idling	Intake/exhaust leak, fuel pressure, excessive fuel in engine oil, engine oil level too high, injector(s), EVAP canister purge valve, wiring, MAF sensor, ECT sensor, HO2S
EFI-233	Long term fuel trim, idle air adjustment	Intake leak/blockage, throttle valve adjustment, accelerator cable adjustment, wiring, IAC valve
EFI-235	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid
EFI-242	Turbocharger (TC) wastegate regulating valve	Wiring, TC wastegate regulating valve
EFI-245	Idle air control (IAC) valve – closing signal	Wiring, IAC valve
EFI-251	Outside air temperature sensor	Wiring, outside air temperature sensor
EFI-254	Engine control relay	Wiring, engine control relay
EFI-311	Vehicle speed signal	Wiring, speedometer
EFI-314	Camshaft position (CMP) sensor	Wiring, poor connection, CMP sensor
EFI-315	Evaporative emission (EVAP) canister purge valve – leak detected	EVAP canister purge valve
EFI-323	Malfunction indicator lamp (MIL)	Wiring, MIL
EFI-325	Engine control module (ECM) – memory fault	ECM disconnected, battery discharged/disconnected, wiring
EFI-335	Petrol: Transmission control module (TCM) – MIL ON request	Wiring
	Diesel: CAN data bus, communication error	Wiring
EFI-336	Transmission control module (TCM) – gear recognition	Wiring
EFI-337	Transmission control module (TCM)/traction control module – torque reduction signal	Wiring, TCM, traction control module
EFI-338	Engine control module (ECM) – immobilizer authorisation signal missing	Immobilizer trouble code IMM-322 stored, wiring
EFI-342	AC relay	Wiring, AC relay
EFI-343	Fuel pump relay	Wiring, fuel pump relay
EFI-353	Immobilizer control module – communication error	Wiring, poor connection, immobilizer control module

Model: S/V40 1,6/1,8/1,9/2,0 • S/V40 1,9 TD • 850 2,0/2,3/2,5/Turbo  
850/S/V70 2,5 TDI (→08/98) • S/V/C70 2,0/2,3/2,5/Turbo  
960 2,5/3,0 • S/V/90 2,9

**VOLVO**



Engine management

Scanner type	Fault location	Probable cause
EFI-355	Mass air flow (MAF) sensor – incorrect signal	MAF sensor, TP sensor
EFI-411	Throttle position (TP) sensor	Wiring, TP sensor
EFI-414	Turbocharger (TC) pressure – control	Hose blocked, TCM wire (TC pressure reduction signal), wiring, MAF sensor, TC wastegate actuator/regulating valve
EFI-415	Manifold absolute pressure (MAP) sensor, TC system	Wiring, MAP sensor, BARO sensor
EFI-422	Motronic 4.4: Barometric pressure (BARO) sensor	Wiring, sensor supply, BARO sensor, AC pressure sensor, fuel tank pressure sensor, G-force sensor
	EMS 2000: Barometric pressure (BARO) sensor	Wiring, BARO sensor
EFI-425	Heated oxygen sensor (HO2S) 2	Intake/exhaust leak, uneven compression, fuel pressure, HO2S
EFI-432	Engine control module (ECM) – overheating	Engine coolant blower motor, air supply blocked
EFI-433	Knock sensor (KS) 2	Wiring, KS
EFI-435	Heated oxygen sensor (HO2S) 1 – slow response	Intake/exhaust leak, uneven compression, fuel pressure, MAF sensor, heating inoperative, HO2S
EFI-436	Heated oxygen sensor (HO2S) 2 – compensation	Intake/exhaust leak, uneven compression, fuel pressure, HO2S 1/2
EFI-442	Pulsed secondary air injection (PAIR) system – excessive flow detected	PAIR valve/solenoid, exhaust leak
EFI-443	Catalytic converter – efficiency below threshold	Intake/exhaust leak, uneven compression, fuel pressure, catalytic converter
EFI-444	G-force sensor	Wiring, sensor supply, AC pressure sensor, fuel tank pressure sensor, G-force sensor
EFI-445	Pulsed secondary air injection (PAIR) pump relay	Wiring, PAIR pump relay
EFI-446	Pulsed secondary air injection (PAIR) valve – leak detected	PAIR valve/solenoid, exhaust leak
EFI-447	Pulsed secondary air injection (PAIR) solenoid	Wiring, PAIR solenoid
EFI-448	Pulsed secondary air injection (PAIR) system – incorrect flow detected	PAIR valve/solenoid, PAIR pump/relay, hoses/pipes blocked, exhaust leak, PAIR pump wiring
EFI-451	Cylinder 1 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding)
EFI-452	Cylinder 2 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding)
EFI-453	Cylinder 3 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding)
EFI-454	Cylinder 4 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding)
EFI-455	Cylinder 5 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding)



**VOLVO**

Model: S/V40 1,6/1,8/1,9/2,0 • S/V40 1,9 TD • 850 2,0/2,3/2,5/Turbo  
 850/S/V70 2,5 TDI (→08/98) • S/V/C70 2,0/2,3/2,5/Turbo  
 960 2,5/3,0 • S/V/90 2,9

**Engine management**

Scanner type	Fault location	Probable cause
EFI-456	Cylinder 6 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding)
EFI-512	Short term fuel trim	Intake/exhaust leak/blockage, MAF sensor, fuel pressure
EFI-513	Engine control module (ECM) – overheating	Engine coolant blower motor, air supply blocked
EFI-514	Engine coolant blower motor relay, low speed	Wiring, engine coolant blower motor relay
EFI-515	Engine coolant blower motor relay, high speed	Wiring, engine coolant blower motor relay
EFI-516	AC condenser blower motor relay	Wiring, AC condenser blower motor relay
EFI-521	Heated oxygen sensor (HO2S) 1 – heater control	Wiring, HO2S
EFI-522	Heated oxygen sensor (HO2S) 2 – heater control	Wiring, HO2S
EFI-525	Ignition coil 1, cylinders 1 & 4	Wiring, ignition coil
EFI-526	Ignition coil 2, cylinders 2 & 3	Wiring, ignition coil
EFI-532	Engine control module (ECM) – power stage – group B	Wiring, IAC valve, TC wastegate regulating valve, engine coolant blower motor relay, ECM
EFI-533	Engine control module (ECM) – power stage – group C	Wiring short circuit at terminal B19, ECM
EFI-534	Engine control module (ECM) – power stage – group D	Wiring short to positive, MIL, engine coolant blower motor relay, fuel pump, ignition coil/amplifier, TCM (load signal), ECM
EFI-535	Engine control module (ECM) – power stage – group E	Wiring short to positive, AC relay/PAIR pump relay, ECM
EFI-541	Evaporative emission (EVAP) canister purge valve – signal	Wiring, EVAP canister purge valve
EFI-543	Misfire detected, at least 1 cylinder	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding)
EFI-545	Misfire detected – at least 1 cylinder – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding)
EFI-551	Cylinder 1, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding)
EFI-552	Cylinder 2, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding)
EFI-553	Cylinder 3, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding)
EFI-554	Cylinder 4, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding)



Model: S/V40 1,6/1,8/1,9/2,0 • S/V40 1,9 TD • 850 2,0/2,3/2,5/Turbo  
850/S/V70 2,5 TDI (→08/98) • S/V/C70 2,0/2,3/2,5/Turbo  
960 2,5/3,0 • S/V/90 2,9

**VOLVO**



## Engine management

Scanner type	Fault location	Probable cause
EFI-555	Cylinder 5, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding)
EFI-556	Cylinder 6, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding)
EFI-611	Fuel tank system – large leak detected	Fuel tank, filler cap/pipe, EVAP system, fuel tank pressure sensor
EFI-612	Fuel tank system – small leak detected	Fuel tank, filler cap/pipe, EVAP system, fuel tank pressure sensor
EFI-614	Evaporative emission (EVAP) canister shut-off valve – incorrect flow detected	Hose blocked, EVAP canister shut-off valve/filter, EVAP canister purge valve, fuel tank pressure sensor
EFI-616	Evaporative emission (EVAP) canister shut-off valve – signal	Wiring, EVAP canister shut-off valve
EFI-621	Fuel tank pressure sensor	Wiring, sensor supply, G-force sensor, AC pressure sensor, fuel tank pressure sensor
EFI-666	Transmission control module (TCM) – access fault memory	Trouble code(s) stored
EFI-711	Injector needle lift sensor	Wiring, injector needle lift sensor
EFI-712	Fuel temperature sensor	Wiring, fuel temperature sensor
EFI-713	Fuel injection timing solenoid	Wiring, fuel injection timing solenoid
EFI-714	Fuel shut-off solenoid	Wiring, fuel shut-off solenoid
EFI-715	Fuel quantity – incorrect flow detected	Wiring, fuel quantity adjuster
EFI-716	Fuel quantity adjuster	Wiring, fuel quantity adjuster/position sensor
EFI-717	Fuel quantity adjuster position sensor	Wiring, fuel quantity adjuster position sensor
EFI-718	Injection timing control	Fuel injection timing circuit
EFI-719	Injector needle lift sensor – engine speed signal	Engine overheated, injector needle lift sensor
EFI-721	Glow plug warning lamp	Wiring, glow plug warning lamp
EFI-724	Engine coolant heater relay	Wiring, engine coolant heater relay, engine coolant heater wiring
EFI-725	Engine control relay	Wiring, engine control relay
EFI-726	Engine control module (ECM) – supply voltage	Wiring, engine control relay
EFI-730	Brake pedal position (BPP) switch	Brake pedal depressed for more than 3 minutes, wiring, BPP switch
EFI-732	Accelerator pedal position (APP) sensor – signal	Wiring, APP sensor
EFI-733	Accelerator pedal position (APP) sensor – supply voltage	Wiring short to earth, excessive load, ECM
EFI-742	Transmission control module (TCM) – communication error	Wiring, TCM, ECM
EFI-743	Cruise control master/selector switch	Wiring, cruise control master/selector switch
EFI-751	Glow plug relay 1	Wiring, glow plug relay
EFI-752	Glow plug relay 2	Wiring, glow plug relay
EFI-761	Glow plugs 1 & 3	Wiring short to earth, glow plug(s)
EFI-762	Glow plugs 2 & 4	Wiring short to earth, glow plug(s)





# VOLVO

**Model:** S60 2,0/2,3 Turbo • S60 2,4/Turbo • V70 2,0/2,3 Turbo • V70 2,4/Turbo • C70 2,0 Turbo • C70 2,3 Turbo  
C70 2,4/Turbo • S80 2,0/2,3 Turbo • S80 2,4/Turbo • S80 2,8 Turbo • S80 2,9 • XC70 2,3/2,5 Turbo  
XC90 2,5 Turbo

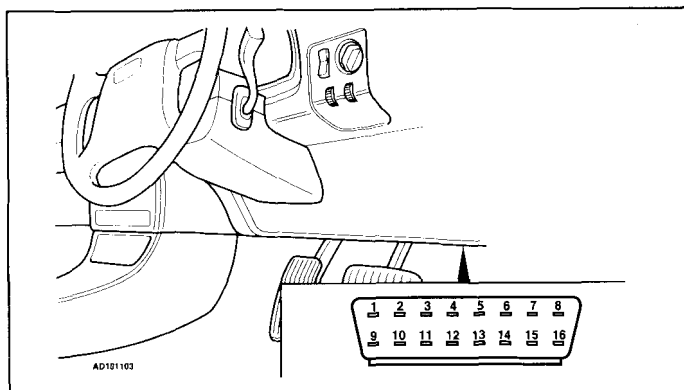
**Year:** 2000-04

**Engine code:** B5204T3, B5204T4, B5204T5, B5234T3, B5234T7, B5234T9, B5244S, B5244S2, B5244T, B5244T3, B5244T7,  
B5254T2, B6284T, B6284T2, B6294S B6294S2

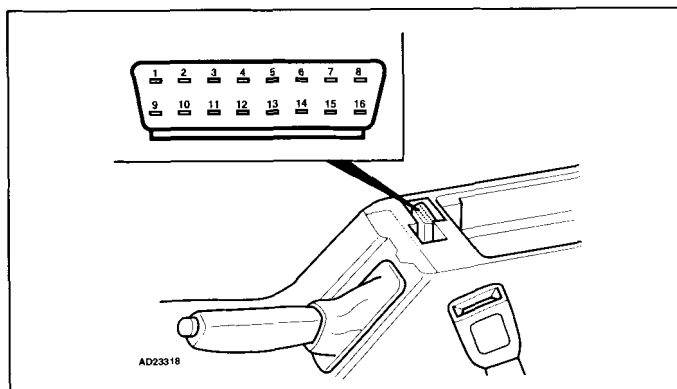
**System:** Denso • Bosch Motronic ME 7.0

## Engine management

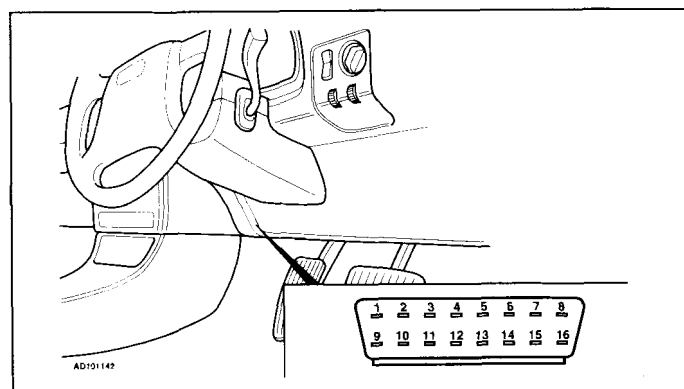
### Data link connector (DLC) locations



S60/S70/V70/XC70/S80 – behind fascia, driver's side



C70 – centre console



XC90 – behind fascia, driver's side

### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

#### Accessing and erasing

- The engine control module (ECM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

Model: S60 2,0/2,3 Turbo • S60 2,4/Turbo • V70 2,0/2,3 Turbo  
V70 2,4/Turbo • C70 2,0 Turbo • C70 2,3 Turbo • C70 2,4/Turbo  
S80 2,0/2,3 Turbo • S80 2,4/Turbo • S80 2,8 Turbo • S80 2,9  
XC70 2,3/2,5 Turbo • XC90 2,5 Turbo

**VOLVO**



Engine management

## Trouble code identification

EOBD type	Volvo type	Fault location	Probable cause
P0	–	Refer to EOBD trouble code table	–
P1011	640A	Intake manifold air control solenoid – range/performance problem	Wiring, intake manifold air control solenoid
P1014	–	Camshaft position (CMP) sensor/crankshaft position (CKP) sensor – signal incompatibility	Incorrectly fitted timing belt, timing belt jumped 1 tooth or more
P1102	150A	Intake manifold air flow adaptation – low limit	Wiring, ECM
P1103	150A	Intake manifold air flow adaptation – high limit	Wiring, ECM
P1106	140A	Manifold absolute pressure (MAP) sensor – range/performance problem	Wiring, poor connection, intake leak/blockage, MAP sensor, ECM
P1107	1400	Manifold absolute pressure (MAP) sensor – signal low	Wiring short to earth, poor connection, sensor supply, MAP sensor, ECM
P1108	1400	Manifold absolute pressure (MAP) sensor – signal high	Wiring short to positive, intake leak, MAP sensor, ECM
P1111	–	Intake air temperature (IAT) sensor – range/performance problem	Wiring, poor connection, IAT sensor
P1112	–	Intake air temperature (IAT) sensor – signal low	Wiring short to earth, poor connection, IAT sensor
P1113	–	Intake air temperature (IAT) sensor – signal high	Wiring short to positive, IAT sensor
P1115	–	Barometric pressure (BARO) sensor – range/performance problem	Wiring, poor connection, BARO sensor
P1116	–	Barometric pressure (BARO) sensor – signal low	Wiring short to earth, poor connection, BARO sensor
P1117	–	Barometric pressure (BARO) sensor – signal high	Wiring short to positive, BARO sensor
P1118	–	Manifold absolute pressure (MAP) sensor/mass air flow (MAF) sensor, adaptation – range/performance problem, lower limit	Wiring, intake leak, MAF sensor, MAP sensor
P1119	–	Manifold absolute pressure (MAP) sensor/mass air flow (MAF) sensor, adaptation – range/performance problem, higher limit	Wiring, intake leak, MAF sensor, MAP sensor
P1129	7120	Heated oxygen sensor (HO2S) – circuit malfunction	Wiring, ECM
P1132	–	Heated oxygen sensor (HO2S) 1, bank 1/heated oxygen sensor (HO2S) 2, bank 1 – signal incompatibility	Wiring, HO2S 1/2, ECM
P1133	–	Heated oxygen sensor (HO2S) 1, bank 1 – heater/signal circuits transposed	Wiring, incorrectly connected, HO2S
P1139	–	Heated oxygen sensor (HO2S) 2, bank 1 – range/performance problem	Wiring, poor connection, catalytic converter, HO2S, ECM
P1152	–	Heated oxygen sensor (HO2S) 1, bank 2/heated oxygen sensor (HO2S) 2, bank 2 – signal incompatibility	Wiring, HO2S 1/2, ECM
P1153	–	Heated oxygen sensor (HO2S) 1, bank 2 – heater/signal circuits transposed	Wiring, incorrectly connected, HO2S
P1159	–	Heated oxygen sensor (HO2S) 2, bank 2 – range/performance problem	Wiring, poor connection, catalytic converter, HO2S, ECM
P1169	–	Heated oxygen sensor (HO2S) 1, bank 1 – no signal	Wiring, heater inoperative, HO2S
P1171	–	System too lean, bank 1 – part load	Intake/exhaust leak, MAF sensor, MAP sensor, fuel pressure low, fuel pump (FP), injector(s), HO2S
P1172	–	System too rich, bank 1 – part load	Intake blocked, EVAP canister purge valve, fuel pressure high, EGR system, injector(s), HO2S



**VOLVO**

Model: S60 2,0/2,3 Turbo • S60 2,4/Turbo • V70 2,0/2,3 Turbo  
V70 2,4/Turbo • C70 2,0 Turbo • C70 2,3 Turbo • C70 2,4/Turbo  
S80 2,0/2,3 Turbo • S80 2,4/Turbo • S80 2,8 Turbo • S80 2,9  
XC70 2,3/2,5 Turbo • XC90 2,5 Turbo

**Engine management**

<b>EOBD type</b>	<b>Volvo type</b>	<b>Fault location</b>	<b>Probable cause</b>
P1174	–	System too lean, bank 1 – full load	Intake/exhaust leak, MAF sensor, MAP sensor, fuel pressure low, fuel pump (FP), injector(s), HO2S
P1175	–	System too rich, bank 1 – full load	Intake blocked, EVAP canister purge valve, fuel pressure high, EGR system, injector(s), HO2S
P1181	–	System too lean, bank 2 – part load	Intake/exhaust leak, MAF sensor, MAP sensor, fuel pressure low, fuel pump (FP), injector(s), HO2S
P1182	–	System too rich, bank 2 – part load	Intake blocked, EVAP canister purge valve, fuel pressure high, EGR system, injector(s), HO2S
P1184	–	System too lean, bank 2 – full load	Intake/exhaust leak, MAF sensor, MAP sensor, fuel pressure low, fuel pump (FP), injector(s), HO2S
P1185	–	System too rich, bank 2 – full load	Intake blocked, EVAP canister purge valve, fuel pressure high, EGR system, injector(s), HO2S
P1236	–	Turbocharger (TC) wastegate regulating valve – inlet pressure lower than expected	Other trouble codes stored (limp home mode initiated), TC wastegate regulating valve stuck open
P1237	–	Turbocharger (TC) boost control deviation	Turbocharger (TC) overboost
P1238	–	Turbocharger (TC) boost pressure sensor – boost control malfunction	TC boost pressure sensor, intake leak/blockage
P1273	–	Electronic throttle system (ETS) – range/performance problem	ETS
P1285	–	Electronic throttle system (ETS), throttle valve adaptation – range/performance problem	ETS
P1286	–	Electronic throttle system (ETS), throttle valve adaptation - aborted	System voltage below 10 V
P1287	–	Electronic throttle system (ETS), throttle valve adaptation - aborted	Throttle motor position sensor
P1293	–	Electronic throttle system (ETS), throttle valve adaptation - repeated	Throttle motor position sensor
P1325	–	Engine control module (ECM), knock control detection – circuit test pulse	ECM
P1326	–	Engine control module (ECM), knock control detection – circuit offset	ECM
P1329	–	Engine control module (ECM), knock control detection – circuit zero-test	ECM
P1330	–	Camshaft position (CMP) actuator, inlet camshaft – valve timing advanced for too long	Wiring, timing belt/chain, mechanical fault, CMP actuator
P1332	–	Camshaft position (CMP) actuator, exhaust camshaft – valve timing advanced for too long	Wiring, timing belt/chain, mechanical fault, CMP actuator
P1336	–	Crankshaft position (CKP) sensor – incorrect signal	Crankshaft position (CKP) sensor, rotor damaged
P1350	–	Ignition coil, cylinder 1, primary – signal low	Wiring short to earth, ignition coil
P1351	–	Ignition coil, cylinder 1, primary – signal high	Wiring short to positive, ignition coil
P1352	–	Ignition coil, cylinder 2, primary – signal low	Wiring short to earth, ignition coil
P1353	–	Ignition coil, cylinder 2, primary – signal high	Wiring short to positive, ignition coil
P1354	–	Ignition coil, cylinder 3, primary – signal low	Wiring short to earth, ignition coil

Model: S60 2,0/2,3 Turbo • S60 2,4/Turbo • V70 2,0/2,3 Turbo  
V70 2,4/Turbo • C70 2,0 Turbo • C70 2,3 Turbo • C70 2,4/Turbo  
S80 2,0/2,3 Turbo • S80 2,4/Turbo • S80 2,8 Turbo • S80 2,9  
XC70 2,3/2,5 Turbo • XC90 2,5 Turbo

**VOLVO**



Engine management

EOBD type	Volvo type	Fault location	Probable cause
P1355	–	Ignition coil, cylinder 3, primary – signal high	Wiring short to positive, ignition coil
P1356	–	Ignition coil, cylinder 4, primary – signal low	Wiring short to earth, ignition coil
P1357	–	Ignition coil, cylinder 4, primary – signal high	Wiring short to positive, ignition coil
P1358	–	Ignition coil, cylinder 5, primary – signal low	Wiring short to earth, ignition coil
P1359	–	Ignition coil, cylinder 5, primary – signal high	Wiring short to positive, ignition coil
P1360	–	Ignition coil, cylinder 6, primary – signal low	Wiring short to earth, ignition coil
P1361	–	Ignition coil, cylinder 6, primary – signal high	Wiring short to positive, ignition coil
P1440	–	Fuel system leak detection pump – malfunction	Fuel system leak detection pump, hose blocked/trapped
P1446	–	Fuel system leak detection pump – circuit malfunction	Wiring, fuel system leak detection pump
P1449	–	Fuel system leak detection pump – signal malfunction	Wiring, ECM
P1460	4050	Fuel level sensor B – circuit malfunction	Wiring, fuel level sensor, ECM
P1500	A02B	CAN data bus – missing ABS signal	Wiring, ABS control module, ECM
P1501	9818	Manifold absolute pressure (MAP) sensor – incorrect signal under deceleration	Wiring, intake leak, MAP sensor
P1513	–	Brake pedal position (BPP) sensor – range/performance problem	Wiring, BPP sensor adjustment, BPP sensor
P1520	917F	Accelerator pedal position (APP) sensor – implausible signal	Wiring, APP sensor, ECM
P1525	–	Brake pedal position (BPP) switch – range/performance problem	Wiring, BPP switch adjustment, BPP switch
P1528	–	Cruise control, plausibility – range/performance problem	Wiring, BPP switch, cruise control master switch
P1550	–	ABS wheel speed sensor, LH or RH front – malfunction	Wiring, wheel speed sensor(s)
P1551	–	ABS wheel speed sensor, LH and RH front – malfunction	Wiring, wheel speed sensors
P1560	–	Cruise control master switch – circuit malfunction	Wiring, cruise control master switch
P1562	–	Cruise control master switch – circuit malfunction	Wiring, cruise control master switch
P1600	–	Electronic throttle system (ETS) – malfunction	Wiring, throttle valve tight/sticking
P1601	–	Electronic throttle system (ETS), throttle motor – circuit malfunction	Wiring, throttle motor
P1602	–	Electronic throttle system (ETS), throttle return spring – malfunction	ETS
P1603	–	Electronic throttle system (ETS) – range/performance problem	Wiring, throttle valve tight/sticking, ETS
P1604	910E	Electronic throttle system (ETS) control module – malfunction	Wiring, ETS control module
P1605	911A	CAN data bus, ETS – range/performance problem	CAN data bus
P1606	912A	Engine control module (ECM)/electronic throttle system (ETS) – no update CAN communication signals	Wiring, ETS, ECM
P1607	–	Electronic throttle system (ETS) – supply voltage low/high	Wiring, alternator, battery

**VOLVO**

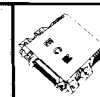
Model: S60 2,0/2,3 Turbo • S60 2,4/Turbo • V70 2,0/2,3 Turbo  
 V70 2,4/Turbo • C70 2,0 Turbo • C70 2,3 Turbo • C70 2,4/Turbo  
 S80 2,0/2,3 Turbo • S80 2,4/Turbo • S80 2,8 Turbo • S80 2,9  
 XC70 2,3/2,5 Turbo • XC90 2,5 Turbo

**Engine management**

EOBD type	Volvo type	Fault location	Probable cause
P1608	903F	Engine control module (ECM)/electronic throttle system (ETS) – implausible static communication signals	Wiring, interference, ETS
P1609	–	Engine control module (ECM)/electronic throttle system (ETS) – implausible dynamic communication signals	Wiring, interference, ETS
P1610	–	Throttle motor position sensor – implausible signal between requested and actual throttle position	Wiring, throttle tight/sticking, ETS
P1611	902A	Engine control module (ECM)/electronic throttle system (ETS) – no update CAN communication signals	Wiring, ETS, ECM
P1612	902B	Engine control module (ECM)/electronic throttle system (ETS) – no communication signal	Wiring, ETS
P1613	902B	Engine control module (ECM)/electronic throttle system (ETS) – communication	Wiring, ETS
P1614	913F	Engine control module (ECM), electronic throttle system (ETS) – implausible signals	Wiring, ETS
P1615	900E	Engine control module (ECM) – malfunction	ECM
P1618	–	Transmission control module (TCM) – MIL request	Automatic transmission malfunction
P1619	–	CAN data bus, digital multifunction display – MIL request	CAN data bus, digital multifunction display
P1620	532D	Engine control module (ECM), fuel cut-off – maximum torque exceeded	Wiring, MAF sensor, MAP sensor, TC regulating valve, ETS, ECM
P1620	–	Electronic throttle system (ETS), ETS warning lamp output – intermittent signal	Wiring, ETS, ECM
P1621	–	Digital multifunction display, real time clock – stored/real time differential out of limits	Digital multifunction display
P1621	–	Electronic throttle system (ETS), ETS warning lamp output – signal low	Wiring short to earth, ETS, ECM
P1622	–	Engine control module (ECM), knock control – circuit malfunction	ECM
P1622	–	Electronic throttle system (ETS), ETS warning lamp output – signal high	Wiring short to positive, ETS, ECM
P1623	–	Engine control module (ECM), HO2S 1 – circuit malfunction	ECM
P1623	–	Electronic throttle system (ETS), ETS warning lamp – circuit malfunction	Wiring, ETS, ECM
P1625	–	Malfunction indicator lamp (MIL) – signal low	Wiring short to earth, ECM
P1626	–	Malfunction indicator lamp (MIL) – signal high	Wiring short to positive, ECM
P1627	–	CAN data bus – first communication message not received	CAN data bus
P1628	901A	CAN data bus – communication	CAN data bus
P1629	–	CAN data bus – serial communication link bus-warning	CAN data bus
P1630	–	Control module – programming error	CAN data bus, serial communication
P1631	–	Transmission control module (TCM) – serial communication	CAN data bus signal not received in time
P1632	–	Multifunction control module, real time clock – stored/real time differential out of limits	Multifunction control module

Model: S60 2,0/2,3 Turbo • S60 2,4/Turbo • V70 2,0/2,3 Turbo  
V70 2,4/Turbo • C70 2,0 Turbo • C70 2,3 Turbo • C70 2,4/Turbo  
S80 2,0/2,3 Turbo • S80 2,4/Turbo • S80 2,8 Turbo • S80 2,9  
XC70 2,3/2,5 Turbo • XC90 2,5 Turbo

**VOLVO**



Engine management

EOBD type	Volvo type	Fault location	Probable cause
P1633	–	CAN data bus, ABS control module (VSS signal) – not received in time	Wiring, CAN data bus, ABS control module
P1635	–	Engine control module (ECM), internal temperature sensor – signal low	ECM, temperature sensor voltage
P1636	–	Engine control module (ECM), internal temperature sensor – signal high	ECM, temperature sensor voltage
P1637	–	Engine control module (ECM), internal temperature high – stage 1	Wiring, module cooling fan
P1638	–	Engine control module (ECM), internal temperature high – stage 2	Wiring, module cooling fan
P1649	–	Camshaft position (CMP) actuator, inlet camshaft – signal low	Wiring short to earth, poor connection, CMP actuator
P1650	–	Camshaft position (CMP) actuator, inlet camshaft – signal high	Wiring short to positive, CMP actuator
P1651 <sup>1</sup>	980F	Mass air flow (MAF) sensor/manifold absolute pressure (MAP) sensor – signal incompatible with throttle position	Wiring, MAF sensor, MAP sensor, TP sensor
P1651 <sup>2</sup>	–	Engine control module (ECM), fuel cut-off – maximum torque exceeded	Wiring, MAF sensor, MAP sensor, TC regulating valve, ETS, ECM
P1652	–	Engine control module (ECM), primary fuel cut-off – implausible signals between sensors	Wiring, MAF sensor, MAP sensor, ETS, ECM
P1655	–	Camshaft position (CMP) actuator, exhaust – signal low	Wiring short to earth, poor connection, CMP actuator
P1656	–	Camshaft position (CMP) actuator, exhaust – signal high	Wiring short to positive, CMP actuator
P1657	–	Electronic throttle system (ETS), MIL request OFF – signal low (MIL ON)	Wiring, ETS
P1658	–	Electronic throttle system (ETS), MIL request ON – signal high (MIL OFF)	Wiring, ETS
P1670	–	Immobilizer control module – communication error/tampering/code error	Wiring, immobilizer control module, ECM
P1671	–	Camshaft position (CMP) actuator – range/performance problem	Wiring, CMP actuator
P1672	–	Camshaft position (CMP) actuator – range/performance problem	Wiring, CMP actuator, incorrect valve timing
P1721	7170	Module cooling fan – continuous low signal or no signal	Wiring, module cooling fan
P1722	7170	Module cooling fan – signal high or continuous signal	Wiring, module cooling fan
P1729	–	Throttle position (TP) sensor – implausible signal between circuit 1 & 2	Wiring, TP sensor
P1738	–	Heated oxygen sensor (HO2S) 2, bank 1 – signal low	Wiring short to earth, poor connection, HO2S, ECM
P1740	–	Leakage module heater – circuit malfunction	Wiring, leakage module heater
P1741	–	Leakage module heater – circuit malfunction	Wiring, leakage module heater
P1742	–	Leakage module heater – circuit malfunction	Wiring, leakage module heater

<sup>1</sup> B5244S.

<sup>2</sup> B6284T/B6294S/B5234T.

<sup>3</sup> B5254T2.





# VOLVO

Model: 240 2,0/2,3 • 740 2,0/2,3 • 740/760 2,0/2,3 Turbo  
850 2,0/2,5 • 940 2,0/Turbo  
940/960 2,0/2,3/Turbo • 940 2,3 LPT

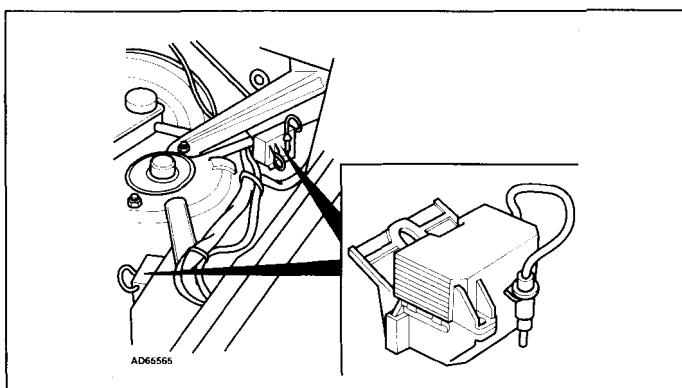
Year: 1989-95

Engine code: B200F, B200FT, B200G, B204E, B204FT, B230F,  
B230FB, B230FD, B230FK, B230FT, B230FX,  
B234F, B5204S, B5254S

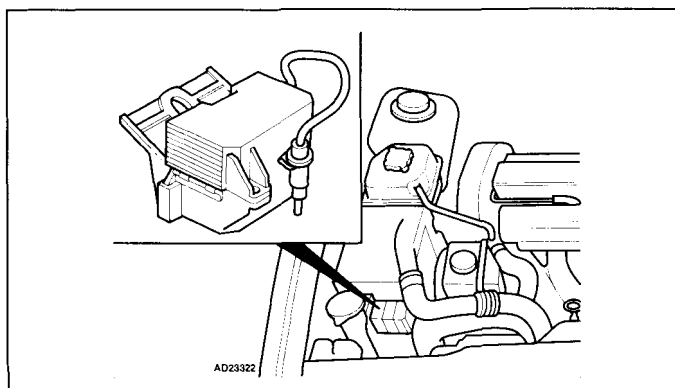
System: Bosch LH-Jetronic 2.4/3.2

## Engine management

### Data link connector (DLC) locations



240, 740/760, 940/960 – engine bay, LH rear



850 – engine bay, RH front

### Trouble codes

#### General information

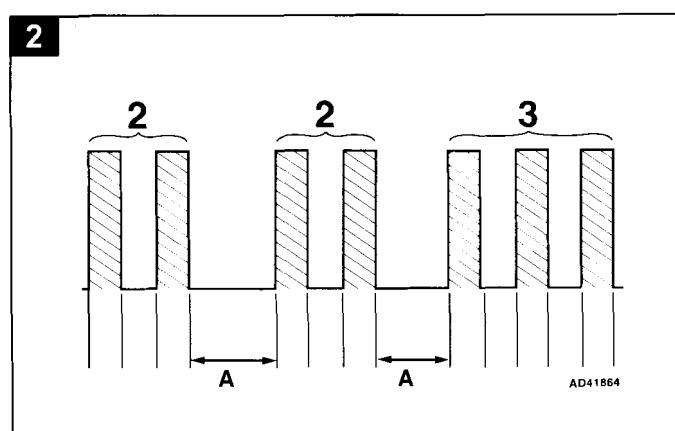
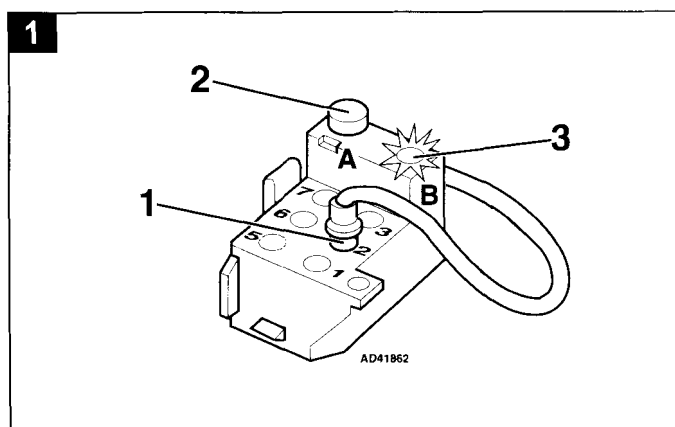
- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the LED on the data link connector (DLC).
- The fuel/ignition/turbocharger control module fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).

#### Accessing

##### Fuel system

- Ensure ignition switched OFF.
- Open cover on black data link connector (DLC).
- Insert selector cable in socket 2 **1** [1].
- Switch ignition ON.
- Depress test button for approximately 1 second **1** [2].
- Count LED flashes **1** [3]. Note trouble code.
- Each trouble code consists of three groups of flashes **2**.
- A 3 second pause separates each group **2** [A].
- For example: Trouble code 223 displayed **2** – idle air control (IAC) valve.
- Repeat switch operation **1** [2]. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF. Rectify faults as necessary.

**NOTE:** Maximum of 3 trouble codes can be stored by memory at one time.



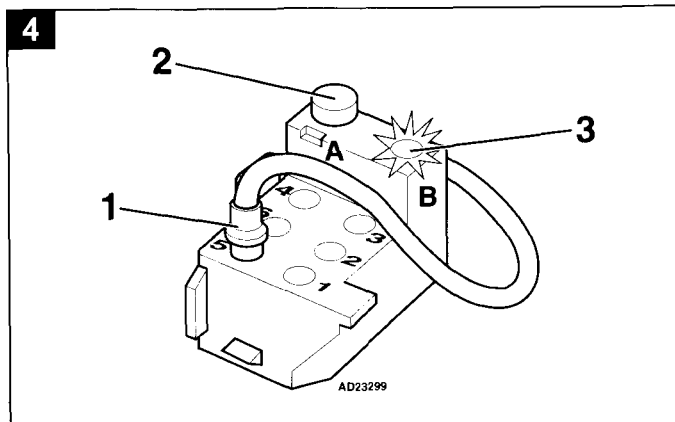
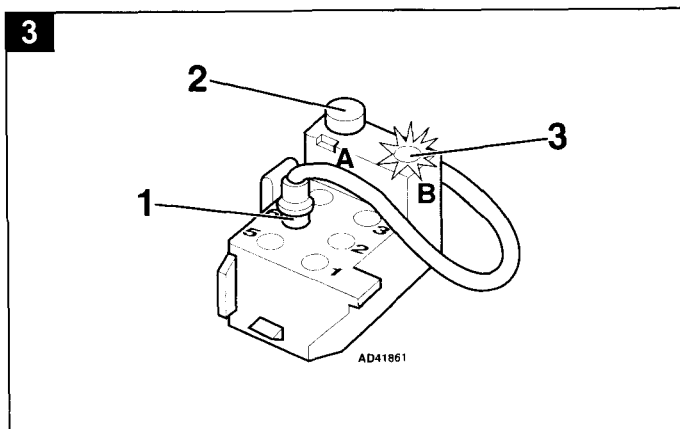




### Ignition system

- Ensure ignition switched OFF.
- Open cover on black data link connector (DLC).
- Insert selector cable in socket 6 **3** [1].
- Switch ignition ON.
- Depress test button for approximately 1 second **3** [2].
- Count LED flashes **3** [3]. Note trouble code.
- Trouble codes are displayed in the same way as those from the fuel system:
  - Each trouble code consists of three groups of flashes **2**.
  - A 3 second pause separates each group **2** [A].
  - For example: Trouble code 223 displayed **2** – idle air control (IAC) valve.
- Repeat switch operation **3** [2]. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF. Rectify faults as necessary.

**NOTE:** Maximum of 3 trouble codes can be stored by memory at one time.



### Erasing

- Ensure ignition switched OFF.
- Insert selector cable:
  - Fuel system – in socket 2 **1** [1].
  - Ignition system – in socket 6 **2** [1].
  - TC system – in socket 5 **4** [1].
- Access trouble codes.

**NOTE:** Trouble codes must be displayed at least once before they can be erased.

- Depress test button for approximately 5 seconds.
- Release test button.
- Wait for LED to illuminate.
- Depress test button for approximately 5 seconds.
- Release test button.
- Depress test button for approximately 1 second.
- Ensure trouble code 111 displayed.

### Turbocharger (TC) system – B204FT

- Ensure ignition switched OFF.
- Open cover on black data link connector (DLC).
- Insert selector cable in socket 5 **4** [1].
- Switch ignition ON.
- Depress test button for approximately 1 second **4** [2].
- Count LED flashes **4** [3]. Note trouble code.
- Trouble codes are displayed in the same way as those from the fuel system:
  - Each trouble code consists of three groups of flashes **2**.
  - A 3 second pause separates each group **2** [A].
  - For example: Trouble code 223 displayed **2** – idle air control (IAC) valve.
- Repeat switch operation **4** [2]. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF. Rectify faults as necessary.

**NOTE:** Maximum of 7 trouble codes can be stored by memory at one time.

**VOLVO**Model: 240 2,0/2,3 • 740 2,0/2,3 • 740/760 2,0/2,3 Turbo • 850 2,0/2,5  
940 2,0/Turbo • 940/960 2,0/2,3/Turbo • 940 2,3 LPT**Engine management****Trouble code identification**

Flash type	Fault location	Probable cause
111	No fault found	—
112	Engine control module (ECM)	ECM
113 <b>1</b>	Fuel trim (FT) – too weak/rich	Intake leak/blockage, excessive fuel in engine oil, fuel pressure, wiring, MAF sensor, HO2S
113 <b>2</b>	Fuel trim (FT) – too weak	Intake leak, fuel pressure low, wiring, MAF sensor, HO2S
121	Mass air flow (MAF) sensor	Wiring, MAF sensor
123	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
131 <b>3</b>	Ignition control module (ICM) – engine RPM signal	Wiring
131 <b>4</b>	Engine speed (RPM) sensor – no signal	Wiring, air gap, RPM sensor
132	Engine control module (ECM) – supply voltage low/high	Battery, alternator
133	Throttle position (TP) switch – CTP contacts	TP switch adjustment, accelerator cable adjustment, wiring, TP switch
142	Ignition control module (ICM)	ICM
143	Knock sensor (KS) 1	Wiring, KS
144	Engine control module (ECM) – load signal	Wiring, ECM
154	Exhaust gas recirculation (EGR) system – excessive flow detected	Wiring, EGR valve, EGR control module, engine coolant thermostat
212	Heated oxygen sensor (HO2S)	Wiring, heating inoperative, MAF sensor, HO2S
213	Throttle position (TP) switch – WOT contacts	TP switch adjustment, accelerator cable adjustment, wiring, TP switch
214	Engine speed (RPM) sensor – intermittent signal	Wiring, flywheel/drive plate damaged, air gap, RPM sensor
221	Fuel trim (FT), part load – too weak	Intake/exhaust leak, fuel pressure, wiring, MAF sensor, HO2S
223	Idle air control (IAC) valve	Wiring, IAC valve
224	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
231 <b>1</b>	Fuel trim (FT), part load – too weak/rich	Intake/exhaust leak, fuel pressure, excessive fuel in engine oil, injector(s), EVAP canister purge valve, wiring, MAF sensor, ECT sensor, HO2S
231 <b>2</b>	Fuel trim (FT), part load – too rich	Fuel pressure high, excessive fuel in engine oil, injector(s), EVAP canister purge valve, wiring, MAF sensor, ECT sensor, HO2S
232	Fuel trim (FT), idling – weak/rich	Intake/exhaust leak, fuel pressure, excessive fuel in engine oil, injector(s), EVAP canister purge valve, wiring, MAF sensor, ECT sensor, HO2S
234	Throttle position (TP) switch – CTP contacts	TP switch adjustment, accelerator cable adjustment, wiring, TP switch
241	Exhaust gas recirculation (EGR) system – insufficient flow detected	Hose leak/blockage, wiring, EGR valve, EGR control module, EGRT sensor, engine coolant thermostat
242	Turbocharger (TC) wastegate regulating valve	Wiring, TC wastegate regulating valve
311	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
312	Ignition control module (ICM) – KS signal missing	Wiring, ICM
314	Camshaft position (CMP) sensor – no/incorrect signal	Wiring, CMP sensor
322	Mass air flow (MAF) sensor – no filament burn-off signal	Wiring, ECM



Flash type	Fault location	Probable cause
324	Camshaft position (CMP) sensor – intermittent signal	Wiring, CMP sensor
342	AC compressor clutch cut-off relay	Wiring, AC compressor clutch cut-off relay
344	Exhaust gas temperature sensor	Wiring, EGRT sensor
411	Throttle position (TP) sensor	Wiring, TP sensor
413	Exhaust gas recirculation temperature (EGRT) sensor	Wiring, EGRT sensor
421	Manifold absolute pressure (MAP) sensor	Hose leak/blockage, TC, TC control module
422 <sup>5</sup>	Exhaust gas temperature sensor	Wiring, exhaust gas temperature sensor
423	Throttle position (TP) sensor	Wiring, TP sensor
424	Engine control module (ECM) – load signal	Wiring, ECM if trouble code also stored in ICM
431	Engine coolant blower motor temperature sensor	Wiring, engine coolant blower motor temperature sensor
432	Engine control module (ECM) – overheating	Engine coolant blower motor, air supply blocked, module cooling fan
433	Knock sensor (KS) 2	Wiring, KS
512	Fuel trim (FT) – too rich	Intake blockage, excessive fuel in engine oil, fuel pressure high, wiring, MAF sensor, HO2S
513	Engine control module (ECM) – overheating	Engine coolant blower motor, air supply blocked, module cooling fan

<sup>1</sup> Bosch LH-Jetronic 2.4

<sup>2</sup> Bosch LH-Jetronic 3.2

<sup>3</sup> Engine control module (ECM).

<sup>4</sup> Ignition control module (ICM).

<sup>5</sup> Has no function on early models. Erase trouble code and check fuel system for trouble code 344.



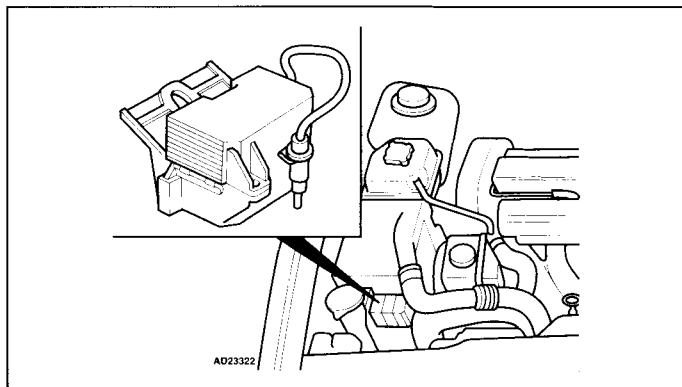


# VOLVO

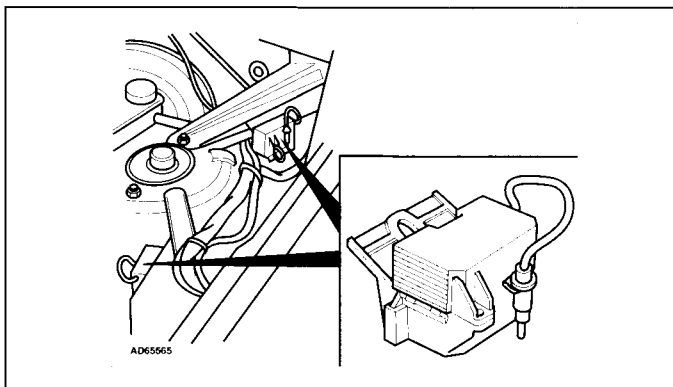
Model: 850 2,0 • 850 2,3/2,5 • 850 2,5 20V • 960 2,5/3,0  
Year: 1990-95  
Engine code: B5202S, B5204T, B5234T, B5234T4, B5234T5,  
B5252S, B5254S, B6254F, B6304F  
System: Bosch Motronic 1.8 • Bosch Motronic 4.3  
Siemens Fenix 5.2

## Engine management

### Data link connector (DLC) locations



850 – engine bay, RH front



960 – engine bay, LH rear

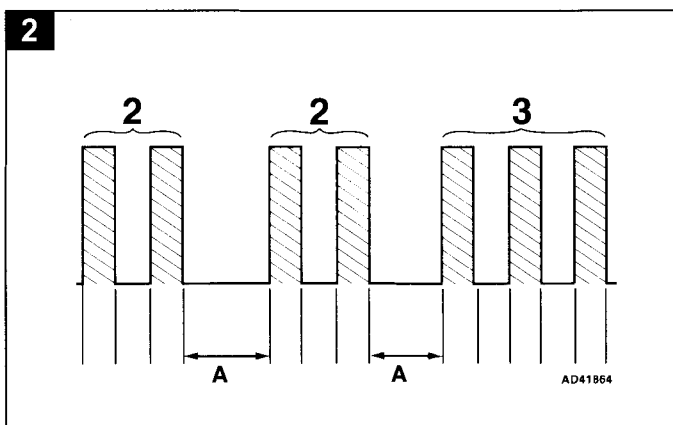
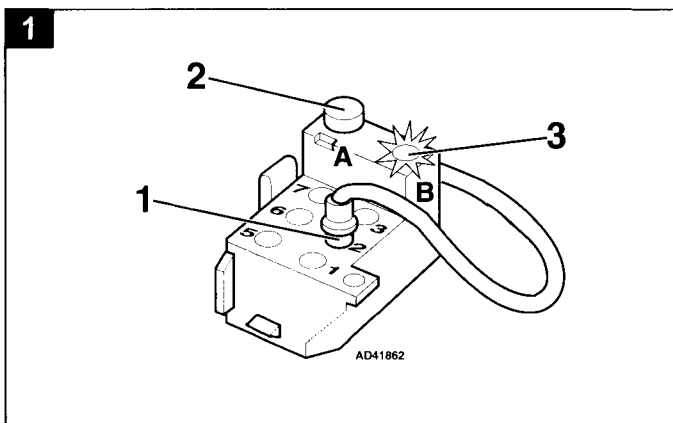
### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the LED on the data link connector (DLC).
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).

#### Accessing

- Ensure ignition switched OFF.
- Open cover on black data link connector (DLC).
- Insert selector cable in socket 2 **1** [1].
- Switch ignition ON.
- Depress test button for approximately 1 second **1** [2].
- Count LED flashes **1** [3]. Note trouble code.
- Each trouble code consists of three groups of flashes **2**.
- A 3 second pause separates each group **2** [A].
- For example: Trouble code 223 displayed **2** – idle air control (IAC) valve.
- Repeat switch operation **1** [2]. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF. Rectify faults as necessary.



**Erasing**

- Ensure ignition switched OFF.
- Insert selector cable in socket 2 **1** [1].
- Access trouble codes.

**NOTE:** *Trouble codes must be displayed at least once before they can be erased.*


- Depress test button for approximately 5 seconds.
- Release test button.
- Wait for LED to illuminate.
- Depress test button for approximately 5 seconds.
- Release test button.
- Depress test button for approximately 1 second.
- Ensure trouble code 111 displayed.

**Trouble code identification**

Flash type	Fault location	Probable cause
111	No fault found	–
112	Engine control module (ECM)	ECM
113 <b>1</b>	Early models: Injector(s)	Wiring, fuse, injector(s)
	Late models: Injectors 1, 2 & 4	Wiring, fuse, injector(s)
113 <b>■</b>	1993: Short term fuel trim	No vacuum to MAP sensor, HO2S/signal short to earth, MAP sensor/earth wire
	1994 →: Short term fuel trim – upper limit reached	Wiring, HO2S
115 <b>1</b>	Injectors 3, 5 & 6	Wiring, fuse, injector(s)
115 <b>3</b>	Injector 1	Wiring, injector
121	Mass air flow (MAF) sensor/manifold absolute pressure (MAP) sensor	Wiring, hose connection, MAF/MAP sensor
122	Intake air temperature (IAT) sensor	Wiring, IAT sensor
123	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
125	Injector 2	Wiring, injector
131	Engine speed (RPM) sensor – no signal	Wiring, RPM sensor
132	Engine control module (ECM) – supply voltage low/high	Battery, alternator
135	Injector 3	Wiring, injector
143	Knock sensor (KS) 1	Wiring, KS
145	Injector 4	Wiring, injector
152	Secondary air injection (AIR) solenoid	Wiring, AIR solenoid
153	Heated oxygen sensor (HO2S) 2	Wiring, heating inoperative, HO2S
154	Exhaust gas recirculation (EGR) system – excessive flow detected	Wiring, EGR valve, EGR control module, engine coolant thermostat
155	Injector 5	Wiring, injector
212	Heated oxygen sensor (HO2S) 1	Wiring, heating inoperative, MAF sensor, HO2S
214	Engine speed (RPM) sensor – intermittent signal	Wiring, flywheel/drive plate damaged, air gap, RPM sensor
221	Long term fuel trim, part load – upper limit reached	Intake/exhaust leak, fuel pressure low, injector(s) blocked, hose connection, wiring, MAF/MAP sensor, ECT sensor, HO2S
222	Engine control relay	Wiring, engine control relay



**Engine management**

Flash type	Fault location	Probable cause
223 	Early models: Idle air control (IAC) valve	Wiring, IAC valve
	Late models: Idle air control (IAC) valve – opening signal	Wiring, IAC valve
225	AC refrigerant pressure sensor	Wiring, AC refrigerant pressure sensor
231	Long term fuel trim, part load – lower limit reached	Fuel pressure high, excessive fuel in engine oil, engine oil level high, injector(s) leaking, EVAP canister purge valve, hose connection, wiring, MAF/MAP sensor, ECT sensor, HO2S
232	Long term fuel trim, idling	Intake/exhaust leak, fuel pressure, excessive fuel in engine oil, injector(s), EVAP canister purge valve, wiring, MAF sensor, ECT sensor, HO2S
233	Long term fuel trim, idle air adjustment	Intake leak/blockage, throttle valve adjustment, wiring, IAC valve
235	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid
241	Exhaust gas recirculation (EGR) system – incorrect flow detected	Hose leak/blockage, wiring, EGR valve, EGR control module, engine coolant thermostat
243	Throttle position (TP) sensor	Wiring, TP sensor
245	Idle air control (IAC) valve – closing signal	Wiring, IAC valve
311	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
314	Camshaft position (CMP) sensor	Wiring, CMP sensor
315	Evaporative emission (EVAP) system	EVAP canister, hose leak/blockage, EVAP canister purge valve
322	Mass air flow (MAF) sensor – no filament burn-off signal	Wiring, ECM
323	Malfunction indicator lamp (MIL)	Wiring, MIL
325	Engine control module (ECM) – supply voltage, battery	Battery discharged/disconnected, wiring, ECM disconnected
335	Transmission control module (TCM) – MIL ON request	Wiring
342	AC relay	Wiring, AC relay
343	Fuel pump relay	Wiring, fuel pump relay
411	Throttle position (TP) sensor	Wiring, TP sensor
413	Exhaust gas recirculation temperature (EGRT) sensor	Wiring, EGRT sensor
414	Turbocharger (TC) pressure – control	TC wastegate regulating valve hose leak/blockage, wiring, MAF sensor, TCM wire (TC boost reduction), TC wastegate regulating valve
416	Transmission control module (TCM) – TC boost reduction signal	Wiring short to earth
432	Engine control module (ECM) – overheating	Engine coolant blower motor, air supply blocked, module cooling fan
433	Knock sensor (KS) 2	Wiring, KS
435	Heated oxygen sensor (HO2S) 1 – slow response	Intake/exhaust leak, fuel pressure, compression, HO2S
436	Heated oxygen sensor (HO2S) 2 – compensation	Intake/exhaust leak, fuel pressure, compression, HO2S 1/2
442	Secondary air injection (AIR) pump relay	Wiring, AIR pump relay
443	Catalytic converter – efficiency	Intake/exhaust leak, fuel pressure, compression, catalytic converter
444	Accelerator pedal position (APP) sensor	Wiring, APP sensor



Flash type	Fault location	Probable cause
451	Cylinder 1 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
452	Cylinder 2 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
453	Cylinder 3 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
454	Cylinder 4 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
455	Cylinder 5 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
511	Long term fuel trim, idling	Intake/exhaust leak, fuel pressure, excessive fuel in engine oil, injector(s), EVAP canister purge valve, wiring, MAF sensor, ECT sensor, HO2S
512 ■	Short term fuel trim – lower limit reached	HO2S signal wire short to earth, EGR system leak, MAP sensor, HO2S, MAP sensor earth wire open circuit/poor connection
512 1	Short term fuel trim	Fuel pressure, wiring, MAF sensor
513	Engine control module (ECM) – overheating	Engine coolant blower motor, air supply blocked, module cooling fan
514	Engine coolant blower motor, low speed	Wiring, engine coolant blower motor relay
515	Engine coolant blower motor, high speed	Wiring, engine coolant blower motor relay
521	Heated oxygen sensor (HO2S) 1 – heater control	Wiring, HO2S
522	Heated oxygen sensor (HO2S) 2 – heater control	Wiring, HO2S
523	Module cooling fan	Wiring, module cooling fan
524	Transmission control module (TCM) – torque reduction signal	Wiring
531	Engine control module (ECM) – power stage – group A	Wiring, injector(s), EVAP canister purge valve, ECM
532	Engine control module (ECM) – power stage – group B	Wiring, IAC valve, TC wastegate regulating valve, engine coolant blower motor relay, ECM
533	Engine control module (ECM) – power stage – group C	Wiring short to positive, EGR control module, engine coolant blower motor relay, TCM (load signal), instrument panel (ECT/RPM/fuel consumption signals), ECM
534	Engine control module (ECM) – power stage – group D	Wiring short to positive, MIL, AC relay, fuel pump, ignition amplifier, ECM
535	Turbocharger (TC) wastegate regulating valve	Wiring, TC wastegate regulating valve
541	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve



**VOLVO**

Model: 850 2,0 • 850 2,3/2,5 • 850 2,5 20V • 960 2,5/3,0

**Engine management**

Flash type	Fault location	Probable cause
542	Misfire detected, more than 1 cylinder	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, fuel pressure, fuel pump/wiring, fuel level low, incorrect/contaminated fuel, engine oil level high, repeated cold starts (flooding), puncture in front tyre
543	Misfire detected, at least 1 cylinder	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
544	Misfire detected, more than 1 cylinder – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, fuel pressure, fuel pump/wiring, fuel level low, incorrect/contaminated fuel, engine oil level high, repeated cold starts (flooding), puncture in front tyre
545	Misfire detected – at least 1 cylinder – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
551	Cylinder 1, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
552	Cylinder 2, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
553	Cylinder 3, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
554	Cylinder 4, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
555	Cylinder 5, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre

**1** Bosch Motronic 1.8**2** Siemens Fenix 5.2**3** Bosch Motronic 4.3



Model: 850 2,0 • 850 2,3/2,5 • 850 2,5 20V • 960 2,5 20V  
S/V70 2,0/2,5 20V

Year: 1995-99

Engine code: B5202S, B5202FS, B5204T, B5204T2, B5234FS,  
B5234T, B5234T2, B5234T4, B5234T5, B5252FS,  
B5252S, B5254S, B6254F, B6304F

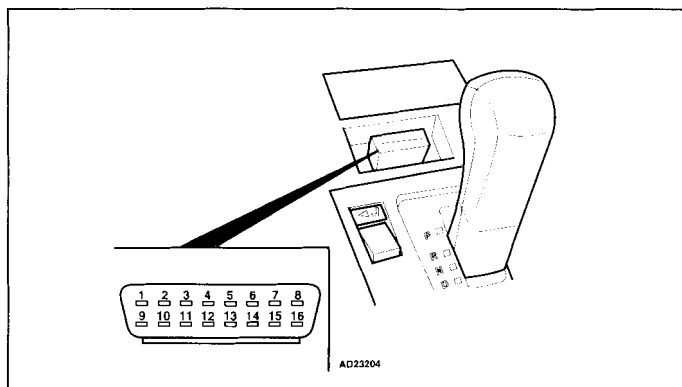
System: Bosch Motronic 1.8 • Bosch Motronic 4.3  
Siemens Fenix 5.2

**VOLVO**

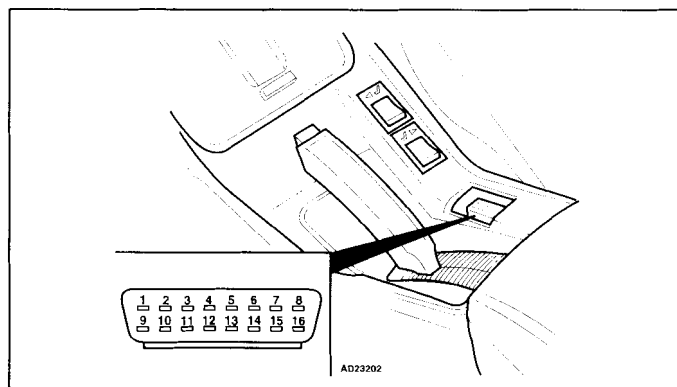


## Engine management

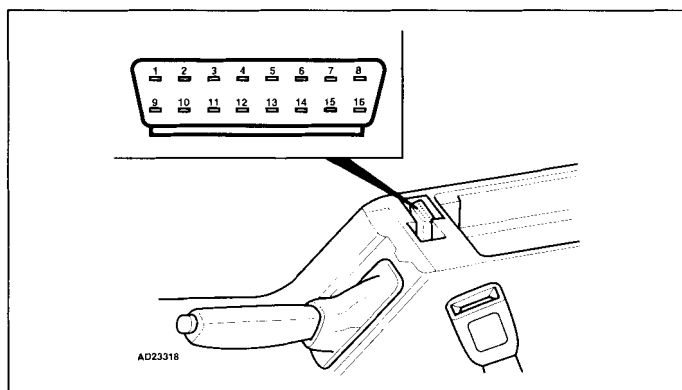
### Data link connector (DLC) locations



850 – near gear lever



960 – centre console



S/V70 – centre console

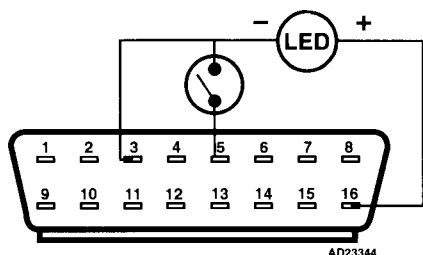
### Trouble codes

#### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- The ECM fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).
- Ensure immobilizer disarmed.

#### Accessing

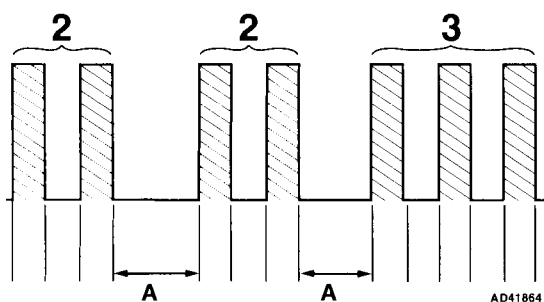
- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminal 3 and 5 with a switched lead – contacts normally open **1**.
- Connect LED test lamp between data link connector (DLC) terminals 3 and 16 **1**.
- Switch ignition ON.
- Operate switch for approximately 1 second.
- Count LED flashes. Note trouble code.
- Each trouble code consists of three groups of flashes **2**.
- A 3 second pause separates each group **2** [A].
- For example: Trouble code 223 displayed **2** – idle air control (IAC) valve.
- Repeat switch operation. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF. Rectify faults as necessary.

**VOLVO**Model: 850 2,0 • 850 2,3/2,5 • 850 2,5 20V • 960 2,5 20V  
S/V70 2,0/2,5 20V**Engine management****1****Erasing**

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminal 3 and 5 with a switched lead – contacts normally open **1**.
- Connect LED test lamp between data link connector (DLC) terminals 3 and 16 **1**.
- Access trouble codes.

**NOTE:** *Trouble codes must be displayed at least once before they can be erased.*

- Operate switch for approximately 5 seconds.
- Release switch.
- Wait for LED to illuminate.
- Operate switch for approximately 5 seconds.
- Release switch.
- Operate switch for approximately 1 second.
- Ensure trouble code 111 displayed.

**2****Trouble code identification**

Flash type	Fault location	Probable cause
111	No fault found	–
112	Engine control module (ECM)	ECM
113 <b>1</b>	Early models: Injector(s)	Wiring, fuse, injector(s)
	Late models: Injectors 1, 2 & 4	Wiring, fuse, injector(s)
113 <b>2</b>	1993: Short term fuel trim	No vacuum to MAP sensor, HO2S/signal short to earth, MAP sensor/earth wire
	1994 →: Short term fuel trim – upper limit reached	Wiring, HO2S
115 <b>1</b>	Injectors 3, 5 & 6	Wiring, fuse, injector(s)
115 <b>2</b>	Injector 1	Wiring, injector
121	Mass air flow (MAF) sensor/manifold absolute pressure (MAP) sensor	Wiring, hose connection, MAF/MAP sensor
122	Intake air temperature (IAT) sensor	Wiring, IAT sensor
123	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
125	Injector 2	Wiring, injector
131	Engine speed (RPM) sensor – no signal	Wiring, RPM sensor
132	Engine control module (ECM) – supply voltage low/high	Battery, alternator
135	Injector 3	Wiring, injector



Flash type	Fault location	Probable cause
143	Knock sensor (KS) 1	Wiring, KS
145	Injector 4	Wiring, injector
152	Secondary air injection (AIR) solenoid	Wiring, AIR solenoid
153	Heated oxygen sensor (HO2S) 2	Wiring, heating inoperative, HO2S
154	Exhaust gas recirculation (EGR) system – excessive flow detected	Wiring, EGR valve, EGR control module, engine coolant thermostat
155	Injector 5	Wiring, injector
212	Heated oxygen sensor (HO2S) 1	Wiring, heating inoperative, MAF sensor, HO2S
214	Engine speed (RPM) sensor – intermittent signal	Wiring, flywheel/drive plate damaged, air gap, RPM sensor
221	Long term fuel trim, part load – upper limit reached	Intake/exhaust leak, fuel pressure low, injector(s) blocked, hose connection, wiring, MAF/MAP sensor, ECT sensor, HO2S
222	Engine control relay	Wiring, engine control relay
223	Early models: Idle air control (IAC) valve	Wiring, IAC valve
	Late models: Idle air control (IAC) valve – opening signal	Wiring, IAC valve
225	AC refrigerant pressure sensor	Wiring, AC refrigerant pressure sensor
231	Long term fuel trim, part load – lower limit reached	Fuel pressure high, excessive fuel in engine oil, engine oil level high, injector(s) leaking, EVAP canister purge valve, hose connection, wiring, MAF/MAP sensor, ECT sensor, HO2S
232	Long term fuel trim, idling	Intake/exhaust leak, fuel pressure, excessive fuel in engine oil, injector(s), EVAP canister purge valve, wiring, MAF sensor, ECT sensor, HO2S
233	Long term fuel trim, idle air adjustment	Intake leak/blockage, throttle valve adjustment, wiring, IAC valve
235	Exhaust gas recirculation (EGR) solenoid	Wiring, EGR solenoid
241	Exhaust gas recirculation (EGR) system – incorrect flow detected	Hose leak/blockage, wiring, EGR valve, EGR control module, engine coolant thermostat
243	Throttle position (TP) sensor	Wiring, TP sensor
245	Idle air control (IAC) valve – closing signal	Wiring, IAC valve
311	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
314	Camshaft position (CMP) sensor	Wiring, CMP sensor
315	Evaporative emission (EVAP) system	EVAP canister, hose leak/blockage, EVAP canister purge valve
322	Mass air flow (MAF) sensor – no filament burn-off signal	Wiring, ECM
323	Malfunction indicator lamp (MIL)	Wiring, MIL
325	Engine control module (ECM) – supply voltage, battery	Battery discharged/disconnected, wiring, ECM disconnected
335	Transmission control module (TCM) – MIL ON request	Wiring
342	AC relay	Wiring, AC relay
343	Fuel pump relay	Wiring, fuel pump relay
411	Throttle position (TP) sensor	Wiring, TP sensor
413	Exhaust gas recirculation temperature (EGRT) sensor	Wiring, EGRT sensor

**VOLVO**Model: 850 2,0 • 850 2,3/2,5 • 850 2,5 20V • 960 2,5 20V  
S/V70 2,0/2,5 20V**Engine management**

Flash type	Fault location	Probable cause
414	Turbocharger (TC) pressure – control	TC wastegate regulating valve hose leak/blockage, wiring, MAF sensor, TCM wire (TC boost reduction), TC wastegate regulating valve
416	Transmission control module (TCM) – TC boost reduction signal	Wiring short to earth
432	Engine control module (ECM) – overheating	Engine coolant blower motor, air supply blocked, module cooling fan
433	Knock sensor (KS) 2	Wiring, KS
435	Heated oxygen sensor (HO2S) 1 – slow response	Intake/exhaust leak, fuel pressure, compression, HO2S
436	Heated oxygen sensor (HO2S) 2 – compensation	Intake/exhaust leak, fuel pressure, compression, HO2S 1/2
442	Secondary air injection (AIR) pump relay	Wiring, AIR pump relay
443	Catalytic converter – efficiency	Intake/exhaust leak, fuel pressure, compression, catalytic converter
444	Accelerator pedal position (APP) sensor	Wiring, APP sensor
451	Cylinder 1 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
452	Cylinder 2 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
453	Cylinder 3 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
454	Cylinder 4 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
455	Cylinder 5 – misfire detected	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
511	Long term fuel trim, idling	Intake/exhaust leak, fuel pressure, excessive fuel in engine oil, injector(s), EVAP canister purge valve, wiring, MAF sensor, ECT sensor, HO2S
512	Short term fuel trim – lower limit reached	HO2S signal wire short to earth, EGR system leak, MAP sensor, HO2S, MAP sensor earth wire open circuit/poor connection
512	Short term fuel trim	Fuel pressure, wiring, MAF sensor
513	Engine control module (ECM) – overheating	Engine coolant blower motor, air supply blocked, module cooling fan
514	Engine coolant blower motor, low speed	Wiring, engine coolant blower motor relay
515	Engine coolant blower motor, high speed	Wiring, engine coolant blower motor relay
521	Heated oxygen sensor (HO2S) 1 – heater control	Wiring, HO2S
522	Heated oxygen sensor (HO2S) 2 – heater control	Wiring, HO2S
523	Module cooling fan	Wiring, module cooling fan
524	Transmission control module (TCM) – torque reduction signal	Wiring



Flash type	Fault location	Probable cause
531	Engine control module (ECM) – power stage – group A	Wiring, injector(s), EVAP canister purge valve, ECM
532	Engine control module (ECM) – power stage – group B	Wiring, IAC valve, TC wastegate regulating valve, engine coolant blower motor relay, ECM
533	Engine control module (ECM) – power stage – group C	Wiring short to positive, EGR control module, engine coolant blower motor relay, TCM (load signal), instrument panel (ECT/RPM/fuel consumption signals), ECM
534	Engine control module (ECM) – power stage – group D	Wiring short to positive, MIL, AC relay, fuel pump, ignition amplifier, ECM
535	Turbocharger (TC) wastegate regulating valve	Wiring, TC wastegate regulating valve
541	Evaporative emission (EVAP) canister purge valve	Wiring, EVAP canister purge valve
542	Misfire detected, more than 1 cylinder	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, fuel pressure, fuel pump/wiring, fuel level low, incorrect/contaminated fuel, engine oil level high, repeated cold starts (flooding), puncture in front tyre
543	Misfire detected, at least 1 cylinder	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
544	Misfire detected, more than 1 cylinder – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, fuel pressure, fuel pump/wiring, fuel level low, incorrect/contaminated fuel, engine oil level high, repeated cold starts (flooding), puncture in front tyre
545	Misfire detected – at least 1 cylinder – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
551	Cylinder 1, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
552	Cylinder 2, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
553	Cylinder 3, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
554	Cylinder 4, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre
555	Cylinder 5, misfire detected – TWC damage	Spark plug, HT lead, distributor rotor/cap, moisture ingress, injector/wiring, air leak, compression, head gasket, low-tension wiring, repeated cold starts (flooding), puncture in front tyre

1 Bosch Motronic 1.8

2 Siemens Fenix 5.2

3 Bosch Motronic 4.3



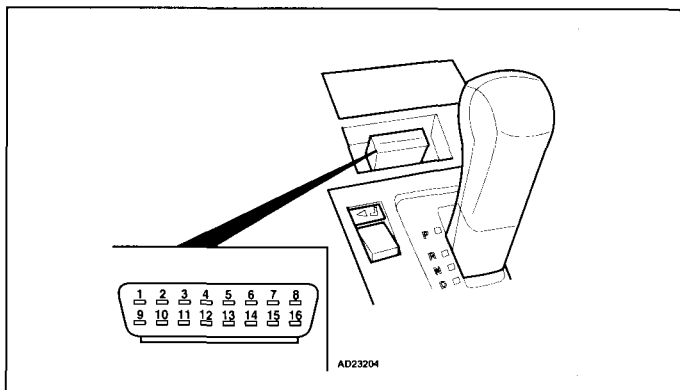
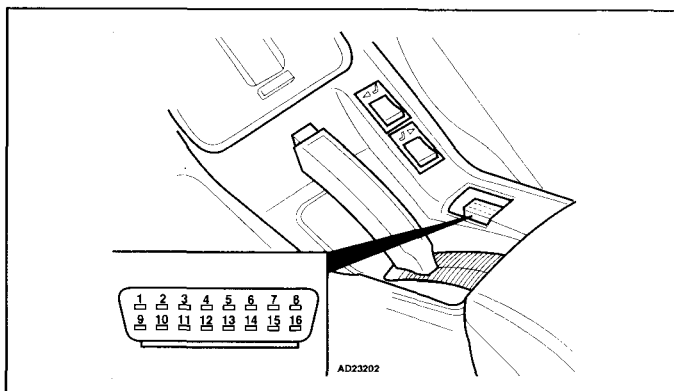
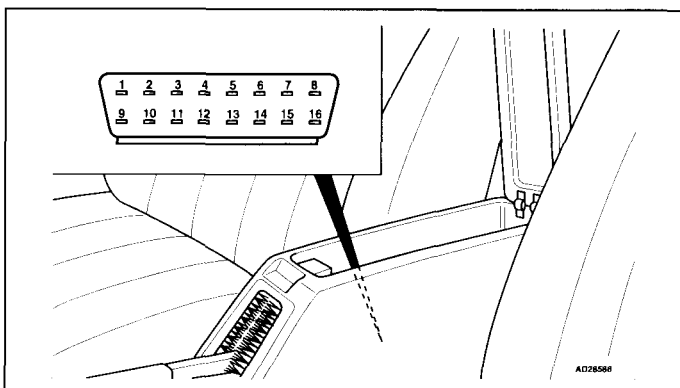
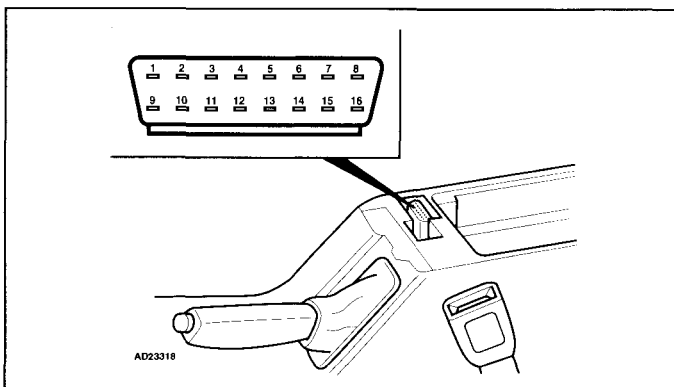
**VOLVO**

Model: 850 2,0/2,5 • 940/960 2,0/2,3/Turbo • 940 2,3 LPT  
S70/V70 2,5 20V

Year: 1995-98

Engine code: B200F, B200FT, B200G, B204E, B204FT, F230F,  
B230FB, B230FD, B230FK, B230FT, B230FX,  
B234F, B5204S, B5254FS/S

System: Bosch LH-Jetronic 2.4/3.2

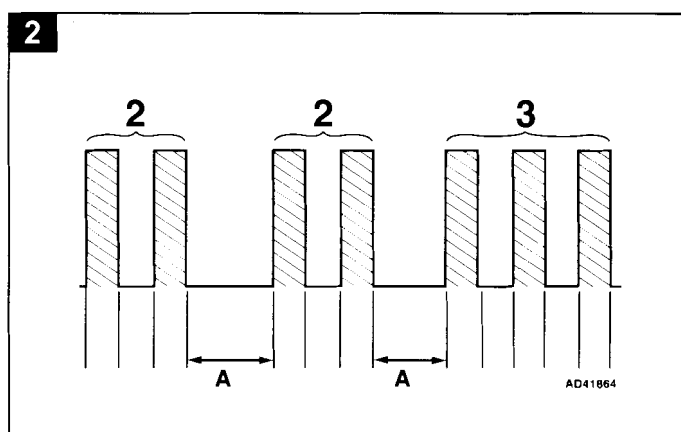
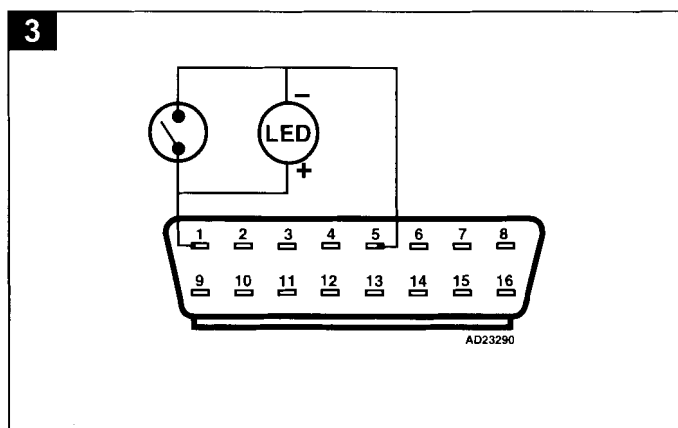
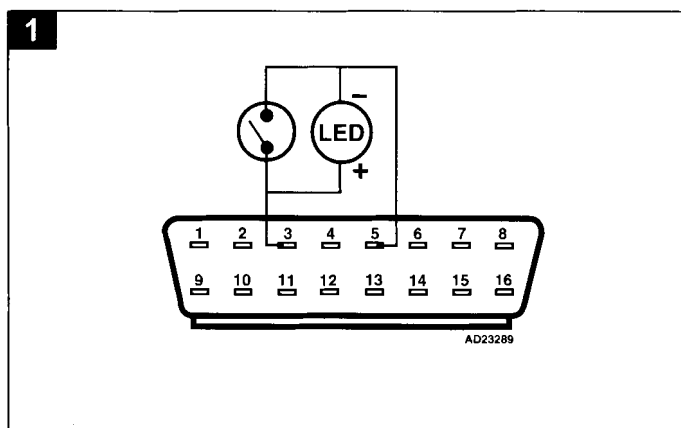
**Engine management****Data link connector (DLC) locations****850 – near gear lever****960 – centre console****940 – centre console****S/V/C70 – centre console****Trouble codes****General information**

- ❑ Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- ❑ Without immobilizer: Trouble codes are displayed by using an LED connected to the data link connector (DLC).
- ❑ Without immobilizer: The fuel/ignition control module fault memory can also be accessed and erased using diagnostic equipment connected to the data link connector (DLC).
- ❑ With immobilizer: The fuel/ignition control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**Accessing – without immobilizer****Fuel system**

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminal 3 and 5 with a switched lead – contacts normally open **1**.
- Connect LED test lamp between data link connector (DLC) terminals 3 and 5 **1**.
- Switch ignition ON.
- Operate switch for approximately 1 second.
- Count LED flashes. Note trouble code.
- Each trouble code consists of three groups of flashes **2**.
- A 3 second pause separates each group **2** [A].
- For example: Trouble code 223 displayed **2** – idle air control (IAC) valve.
- Repeat switch operation. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF. Rectify faults as necessary.

**NOTE:** *Maximum of 3 trouble codes can be stored by memory at one time.*



#### Ignition system

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminal 1 and 5 with a switched lead – contacts normally open **3**.
- Connect LED test lamp between data link connector (DLC) terminals 1 and 5 **3**.
- Switch ignition ON.
- Operate switch for approximately 1 second.
- Count LED flashes. Note trouble code.
- Trouble codes are displayed in the same way as those from the fuel system:
  - Each trouble code consists of three groups of flashes **2**.
  - A 3 second pause separates each group **2** [A].
  - For example: Trouble code 223 displayed **2** – idle air control (IAC) valve.
- Repeat switch operation. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF. Rectify faults as necessary.

**NOTE:** *Maximum of 3 trouble codes can be stored by memory at one time.*

#### Accessing – with immobilizer

- The fuel/ignition control module fault memory can only be accessed using diagnostic equipment connected to the data link connector (DLC).

#### Erasing – without immobilizer

- Ensure ignition switched OFF.
- Bridge data link connector (DLC) terminal with a switched lead – contacts normally open:
  - Fuel system – terminals 3 & 5 **1**.
  - Ignition system – terminals 1 & 5 **3**.
- Connect LED test lamp between data link connector (DLC) terminals:
  - Fuel system – terminals 3 & 5 **1**.
  - Ignition system – terminals 1 & 5 **3**.
- Access trouble codes.

**NOTE:** *Trouble codes must be displayed at least once before they can be erased.*

- Operate switch for approximately 5 seconds.
- Release switch.
- Wait for LED to illuminate.
- Operate switch for approximately 5 seconds.
- Release switch.
- Operate switch for approximately 1 second.
- Ensure trouble code 111 displayed.

#### Erasing – with immobilizer

- The fuel/ignition control module fault memory can only be erased using diagnostic equipment connected to the data link connector (DLC).

**VOLVO**Model: 850 2,0/2,5 • 940/960 2,0/2,3/Turbo • 940 2,3 LPT  
S70/V70 2,5 20V**Engine management****Trouble code identification**

Flash type	Fault location	Probable cause
111	No fault found	–
112	Engine control module (ECM)	ECM
113 ■	Fuel trim (FT) – too weak/rich	Intake leak/blockage, excessive fuel in engine oil, fuel pressure, wiring, MAF sensor, HO2S
113 ■ 2	Fuel trim (FT) – too weak	Intake leak, fuel pressure low, wiring, MAF sensor, HO2S
121	Mass air flow (MAF) sensor	Wiring, MAF sensor
123	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
131 ■ 3	Ignition control module (ICM) – engine RPM signal	Wiring
131 ■	Engine speed (RPM) sensor – no signal	Wiring, air gap, RPM sensor
132	Engine control module (ECM) – supply voltage low/high	Battery, alternator
133	Throttle position (TP) switch – CTP contacts	TP switch adjustment, accelerator cable adjustment, wiring, TP switch
142	Ignition control module (ICM)	ICM
143	Knock sensor (KS) 1	Wiring, KS
144	Engine control module (ECM) – load signal	Wiring, ECM
154	Exhaust gas recirculation (EGR) system – excessive flow detected	Wiring, EGR valve, EGR control module, engine coolant thermostat
212	Heated oxygen sensor (HO2S)	Wiring, heating inoperative, MAF sensor, HO2S
213	Throttle position (TP) switch – WOT contacts	TP switch adjustment, accelerator cable adjustment, wiring, TP switch
214	Engine speed (RPM) sensor – intermittent signal	Wiring, flywheel/drive plate damaged, air gap, RPM sensor
221	Fuel trim (FT), part load – too weak	Intake/exhaust leak, fuel pressure, wiring, MAF sensor, HO2S
223	Idle air control (IAC) valve	Wiring, IAC valve
224	Engine coolant temperature (ECT) sensor	Wiring, ECT sensor
231 ■ 1	Fuel trim (FT), part load – too weak/rich	Intake/exhaust leak, fuel pressure, excessive fuel in engine oil, injector(s), EVAP canister purge valve, wiring, MAF sensor, ECT sensor, HO2S
231 ■ 2	Fuel trim (FT), part load – too rich	Fuel pressure high, excessive fuel in engine oil, injector(s), EVAP canister purge valve, wiring, MAF sensor, ECT sensor, HO2S
232	Fuel trim (FT), idling – weak/rich	Intake/exhaust leak, fuel pressure, excessive fuel in engine oil, injector(s), EVAP canister purge valve, wiring, MAF sensor, ECT sensor, HO2S
234	Throttle position (TP) switch – CTP contacts	TP switch adjustment, accelerator cable adjustment, wiring, TP switch
241	Exhaust gas recirculation (EGR) system – insufficient flow detected	Hose leak/blockage, wiring, EGR valve, EGR control module, EGRT sensor, engine coolant thermostat
242	Turbocharger (TC) wastegate regulating valve	Wiring, TC wastegate regulating valve
311	Vehicle speed sensor (VSS)	Wiring, speedometer, VSS
312	Ignition control module (ICM) – KS signal missing	Wiring, ICM
314	Camshaft position (CMP) sensor – no/incorrect signal	Wiring, CMP sensor





Flash type	Fault location	Probable cause
322	Mass air flow (MAF) sensor – no filament burn-off signal	Wiring, ECM
324	Camshaft position (CMP) sensor – intermittent signal	Wiring, CMP sensor
342	AC compressor clutch cut-off relay	Wiring, AC compressor clutch cut-off relay
344	Exhaust gas temperature sensor	Wiring, EGRT sensor
411	Throttle position (TP) sensor	Wiring, TP sensor
413	Exhaust gas recirculation temperature (EGRT) sensor	Wiring, EGRT sensor
421	Manifold absolute pressure (MAP) sensor	Hose leak/blockage, TC, TC control module
422 <sup>1</sup>	Exhaust gas temperature sensor	Wiring, exhaust gas temperature sensor
423	Throttle position (TP) sensor	Wiring, TP sensor
424	Engine control module (ECM) – load signal	Wiring, ECM if trouble code also stored in ICM
431	Engine coolant blower motor temperature sensor	Wiring, engine coolant blower motor temperature sensor
432	Engine control module (ECM) – overheating	Engine coolant blower motor, air supply blocked, module cooling fan
433	Knock sensor (KS) 2	Wiring, KS
512	Fuel trim (FT) – too rich	Intake blockage, excessive fuel in engine oil, fuel pressure high, wiring, MAF sensor, HO2S
513	Engine control module (ECM) – overheating	Engine coolant blower motor, air supply blocked, module cooling fan

<sup>1</sup> Bosch LH-Jetronic 2.4

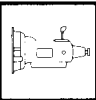
<sup>2</sup> Bosch LH-Jetronic 3.2

<sup>3</sup> Engine control module (ECM).

<sup>4</sup> Ignition control module (ICM).

<sup>5</sup> Has no function on early models. Erase trouble code and check fuel system for trouble code 344.



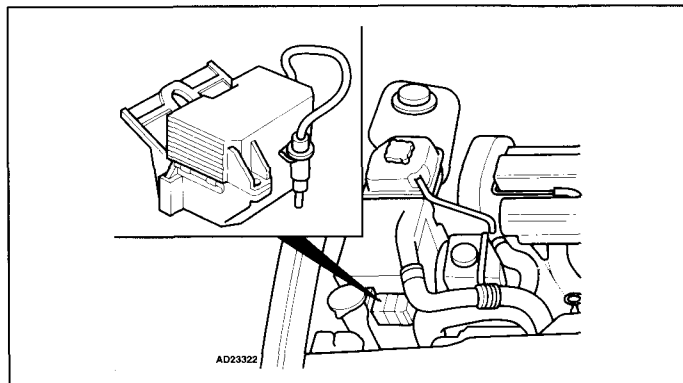
**VOLVO**

Model:

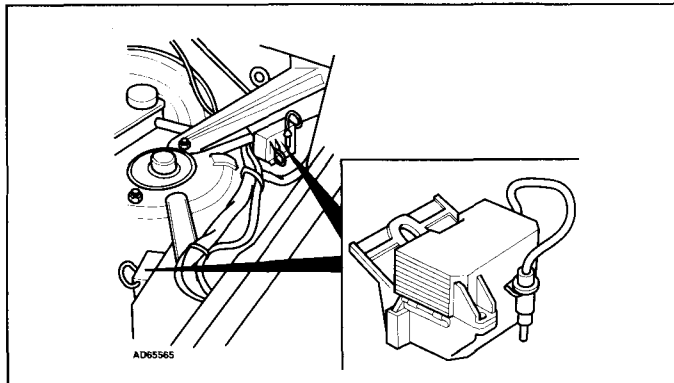
850 • 960

Year:

1990-95

**Transmission****Data link connector (DLC) locations**

850 – engine bay, RH front



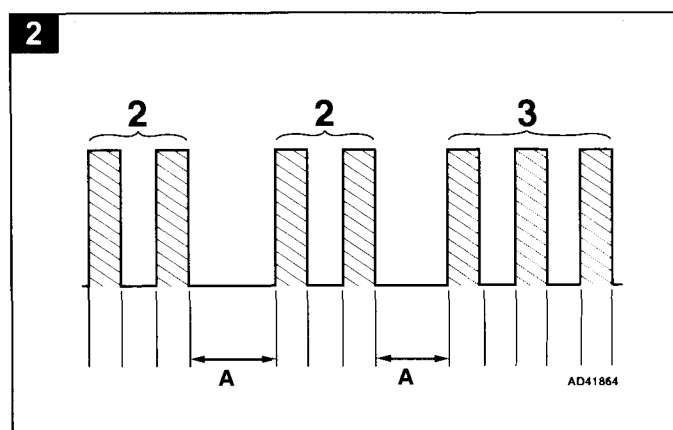
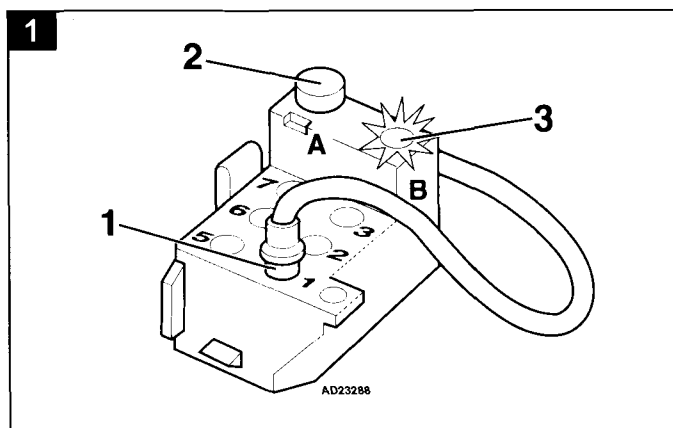
960 – engine bay, LH rear

**Trouble codes****General information**

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.
- Trouble codes are displayed by the LED on the data link connector (DLC).
- The transmission control module (TCM) fault memory can also be checked and erased using diagnostic equipment connected to the data link connector (DLC).

**Accessing**

- Ensure ignition switched OFF.
- Open cover on black data link connector (DLC).
- Insert selector cable in socket 1 **1** [1].
- Switch ignition ON.
- Depress test button for approximately 1 second **1** [2].
- Count LED flashes **1** [3]. Note trouble code.
- Each trouble code consists of three groups of flashes **2**.
- A 3 second pause separates each group **2** [A].
- For example: Trouble code 223 displayed **2** – throttle position (TP) sensor.
- Repeat switch operation **1** [2]. Note trouble codes. Compare with trouble code table.
- Switch ignition OFF. Rectify faults as necessary.





### Erasing

- Ensure ignition switched OFF.
- Insert selector cable in socket 1 **1** [1].
- Access trouble codes.

**NOTE:** *Trouble codes must be displayed at least once before they can be erased.*

- Depress test button for approximately 5 seconds.
- Release test button.
- Wait for LED to illuminate.
- Depress test button for approximately 5 seconds.
- Release test button.
- Depress test button for approximately 1 second.
- Ensure trouble code 111 displayed.

### Trouble code identification

Flash type	Fault location	Probable cause
111	No fault found	–
112	Shift solenoid (SS) 1 – short to positive	Wiring short to positive, SS
113	Transmission control module (TCM) – short circuit to SS 2	TCM supply/earth wiring, SS signal wire, TCM
114	Transmission mode selection switch – open circuit	Wiring open circuit, transmission mode selection switch
121	Shift solenoid (SS) 1 – short to earth	Wiring short to earth, SS
122	Shift solenoid (SS) 1 – open circuit	Wiring open circuit, SS
123	Transmission fluid pressure (TFP) solenoid – short to positive	Wiring short to positive, TFP solenoid
124	Transmission mode selection switch – short to earth	Wiring short to earth, transmission mode selection switch
131	Transmission fluid pressure (TFP) solenoid – open circuit/short to earth	Wiring open/short to earth, TFP solenoid
132	Transmission control module (TCM) – supply voltage to TFP solenoid defective	Wiring, TCM
134	Engine control module (ECM) – incorrect load signal	Wiring, ECM, TCM
141	Transmission fluid temperature (TFT) sensor – short circuit	Wiring short circuit, TFT sensor
142	Transmission fluid temperature (TFT) sensor – open circuit	Wiring open circuit, TFT sensor
143	Transmission kick-down switch – short to earth	Wiring, transmission kick-down switch
211	Transmission control module (TCM) – short circuit to SS 1	TCM supply/earth wiring, SS signal wire, TCM
212	Shift solenoid (SS) 2 – short to positive	Wiring short to positive, SS
213	Engine control module (ECM), TP sensor signal – high input	ECM trouble code(s) stored, ECM/TCM electrical connection, ECM/TCM earth wiring
221	Shift solenoid (SS) 2 – short to earth	Wiring short to earth, SS
222	Shift solenoid (SS) 2 – open circuit	Wiring open circuit, SS
223	Engine control module (ECM), TP sensor signal – low input	ECM trouble code(s) stored, ECM/TCM electrical connection open/short to earth, ECM/TCM earth wiring

**VOLVO**

Model: 850 • 960

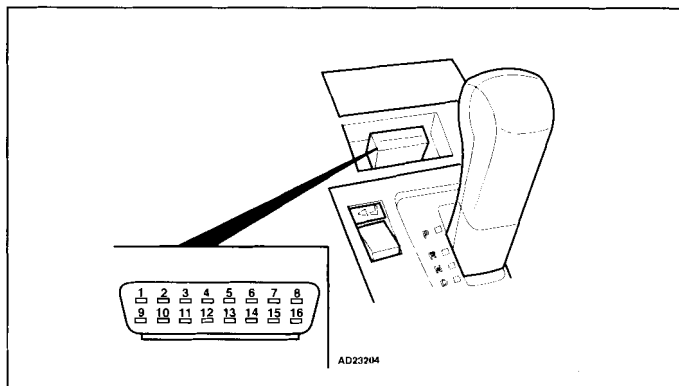
**Transmission**

Flash type	Fault location	Probable cause
231	Engine control module (ECM), TP sensor signal – implausible	ECM trouble code(s) stored, ECM/TCM electrical connection, ECM/TCM earth wiring, electrical interference
232	Vehicle speed sensor (VSS) – no signal	Wiring, speedometer, VSS
233	Vehicle speed sensor (VSS) – implausible signal	Wiring, poor connection, electrical interference, speedometer, VSS
235	Transmission fluid temperature (TFT) sensor – high input	ATF level incorrect, towing weight limit exceeded, wiring, TFT sensor
245	ECM/TCM electrical connection – torque reduction signal	Wiring, ECM, TCM
311	Input shaft speed (ISS) sensor – no signal	Wiring, ISS sensor
312	Input shaft speed (ISS) sensor – implausible signal	Wiring, electrical interference, ISS sensor
313	Transmission range (TR) switch	Incorrect adjustment, wiring, TR switch
322	Gear ratio – incorrect	Mechanical transmission fault, TCM program error
323	Transmission lock-up slipping/not engaged – ISS sensor/VSS signals, excessive variation	Mechanical transmission fault
331	Transmission lock-up solenoid – short to positive	Wiring short to positive, transmission lock-up solenoid
332	Transmission lock-up solenoid – open circuit	Wiring open circuit, transmission lock-up solenoid
333	Transmission lock-up solenoid – short to earth	Wiring short to earth, transmission lock-up solenoid

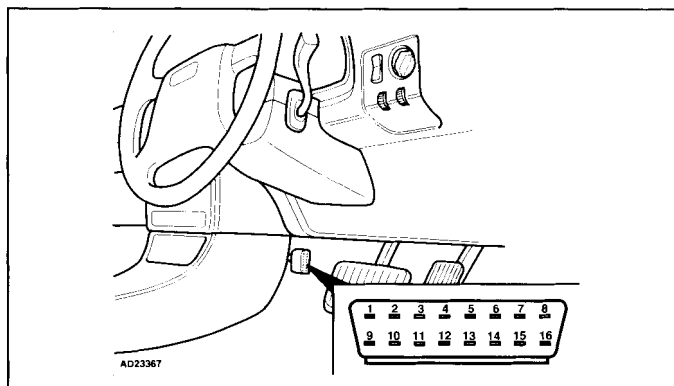




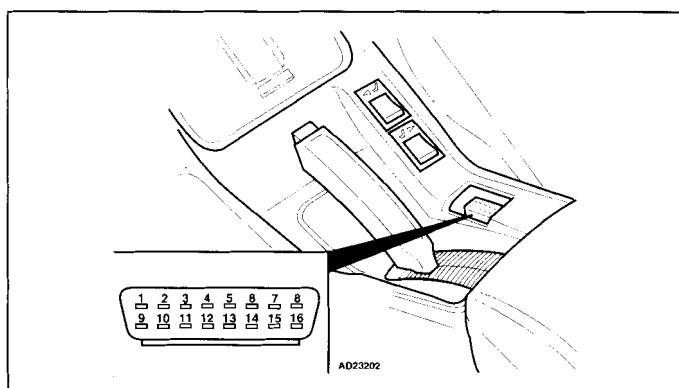
## Data link connector (DLC) locations



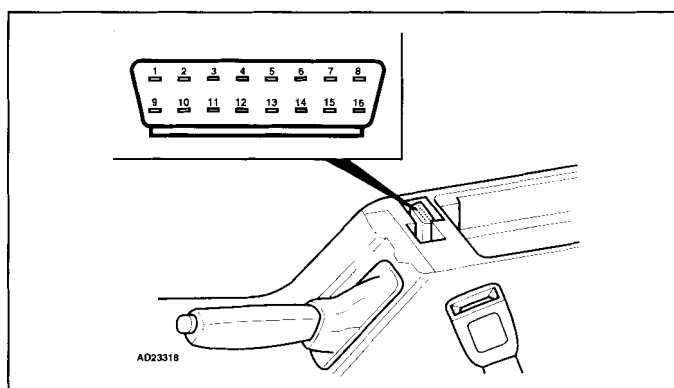
850 – near gear lever



S/V40 – under fascia, driver's side



960 – centre console



S/V/C70 – centre console

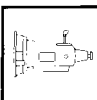
## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The transmission control module (TCM) fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

**VOLVO**

Model: 850 • S/N/C70 • 960

**Transmission****Trouble code identification**

Scanner type	Fault location	Probable cause
AT-111	No fault found	–
AT-114	Transmission mode selection switch – high input	Switch incorrectly operated, wiring open circuit/short to positive, transmission mode selection switch
AT-121	Shift solenoid (SS) 1 – short to earth	Wiring short to earth, SS
AT-122	Shift solenoid (SS) 1 – circuit malfunction	Wiring, SS
AT-123	Transmission fluid pressure (TFP) solenoid – short to positive	Wiring short to positive, TFP solenoid
AT-124	Transmission mode selection switch – low input	Wiring short to earth, transmission mode selection switch, 'W' button pressed for more than 25 seconds
AT-131	Transmission fluid pressure (TFP) solenoid – open circuit/short to earth	Wiring open/short to earth, TFP solenoid
AT-132	Transmission control module (TCM) – supply voltage to TFP solenoid defective	TCM
AT-134	Engine control module (ECM) – incorrect load signal	Wiring, ECM, TCM
AT-141	Transmission fluid temperature (TFT) sensor – low input	Wiring short to earth, TFT sensor
AT-142	Transmission fluid temperature (TFT) sensor – high input	Wiring open/short to positive, TFT sensor
AT-143	Transmission kick-down switch – low input	Wiring short to earth, transmission kick-down switch, TP sensor adaptation/signal
AT-213	Engine control module (ECM), TP sensor signal – high input	ECM trouble code(s) stored, ECM/TCM electrical connection short to positive, ECM/TCM earth wiring
AT-221	Shift solenoid (SS) 2 – short to earth	Wiring short to earth, SS
AT-222	Shift solenoid (SS) 2 – circuit malfunction	Wiring, SS
AT-223	Engine control module (ECM), TP sensor signal – low input	ECM trouble code(s) stored, ECM/TCM electrical connection open/short to earth, ECM/TCM earth wiring
AT-232	Vehicle speed sensor (VSS) – no signal	Wiring, speedometer, VSS
AT-235	Transmission fluid temperature (TFT) sensor – high input	ATF level incorrect, towing weight limit exceeded, wiring, TFT sensor
AT-243	ECM/TCM electrical connection, torque reduction – signal low	Ignition switched on with ECM disconnected, wiring open/short to earth, TR switch
AT-244	ECM/TCM electrical connection, torque reduction – signal high	Wiring short to positive, TR switch
AT-245	ECM/TCM electrical connection – torque reduction signal	Wiring, ECM, TCM
AT-311	Input shaft speed (ISS) sensor – no signal	Wiring, ISS sensor
AT-312	Input shaft speed (ISS) sensor – implausible signal	Wiring, electrical interference, ISS sensor
AT-313	Transmission range (TR) switch	Incorrect adjustment, wiring, TR switch
AT-321	Gear 1 – incorrect ratio	Electrical interference of ISS sensor/VSS signal, ISS sensor/VSS signal faulty, TR switch adjustment/defective, ATF level low, mechanical transmission fault, wiring
AT-322	Gear 2 – incorrect ratio	Electrical interference of ISS sensor/VSS signal, ISS sensor/VSS signal faulty, TR switch adjustment/defective, ATF level low, mechanical transmission fault, wiring



Scanner type	Fault location	Probable cause
AT-323	Gear 3 – incorrect ratio	Electrical interference of ISS sensor/VSS signal, ISS sensor/VSS signal faulty, TR switch adjustment/defective, ATF level low, mechanical transmission fault, wiring
AT-324	Gear 4 – incorrect ratio	Electrical interference of ISS sensor/VSS signal, ISS sensor/VSS signal faulty, TR switch adjustment/defective, ATF level low, mechanical transmission fault, wiring
AT-331	Transmission lock-up solenoid – short to positive	Wiring short to positive, transmission lock-up solenoid
AT-332	Transmission lock-up solenoid – open circuit	Wiring open circuit, transmission lock-up solenoid
AT-333	Transmission lock-up solenoid – short to earth	Wiring short to earth, transmission lock-up solenoid
AT-341	Transmission lock-up slipping/not engaged – ISS sensor/VSS signal, excessive variation	Mechanical transmission fault, transmission lock-up solenoid wiring/defective
AT-411	Transmission control module (TCM) – EEPROM error	TCM
AT-421	Transmission control module (TCM) – supply voltage low	Battery, fuse, alternator, wiring
AT-511	Engine control module (ECM)/transmission control module (TCM), communication – ECM not recognised	Incorrect ECM/TCM
AT-521	Engine control module (ECM)/transmission control module (TCM) – communication error	Wiring, ECM, TCM
AT-522	Engine control module (ECM)/transmission control module (TCM) – communication error	Wiring, ECM, TCM
AT-523	Engine control module (ECM)/transmission control module (TCM) – communication error	Wiring, ECM, TCM
AT-524	Engine control module (ECM)/transmission control module (TCM) – communication error	Wiring, ECM, TCM
AT-525	Engine control module (ECM)/transmission control module (TCM) – communication error	Wiring, ECM, TCM
AT-526	Engine control module (ECM)/transmission control module (TCM) – communication error	Wiring, ECM, TCM
AT-527	Engine control module (ECM)/transmission control module (TCM) – communication error	Wiring, ECM, TCM





**VOLVO**

Model:

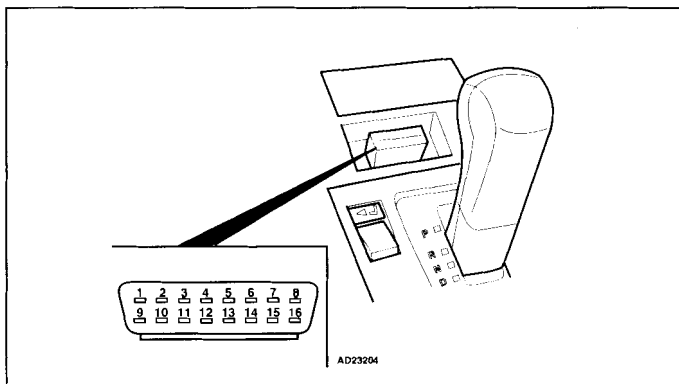
S/V40 • 850 • S/V/C70 • 940/960

Year:

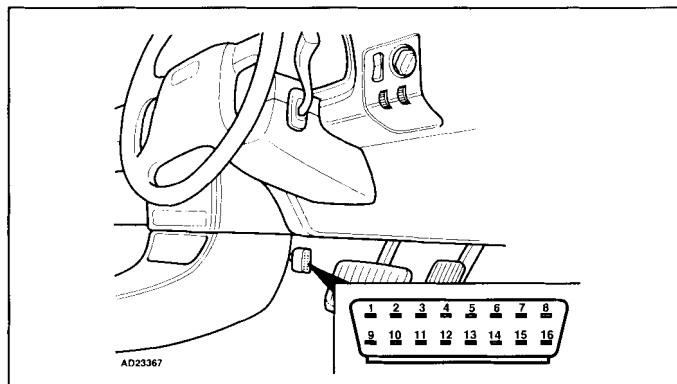
1995-00

Immobilizer

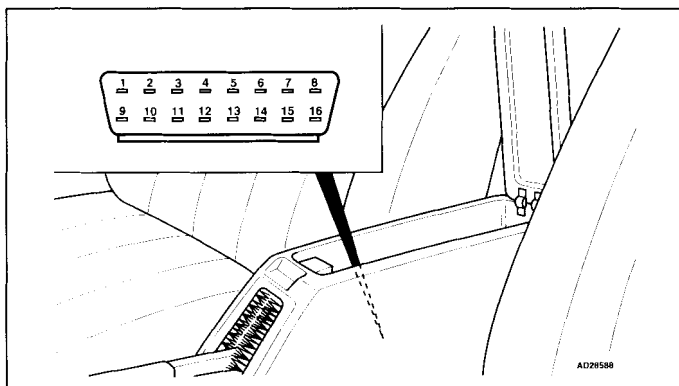
## Data link connector (DLC) locations



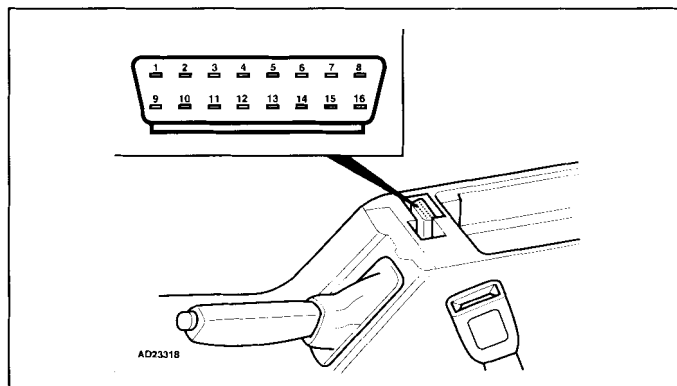
850 – near gear lever



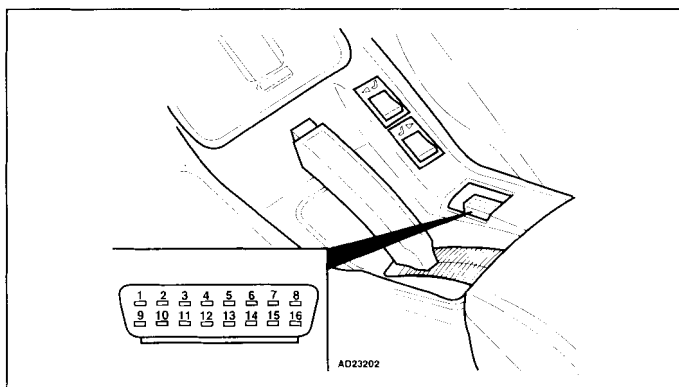
S/V40 – under fascia, driver's side



940 – centre console



S/V/C70 – centre console



960 – centre console





## Trouble codes

### General information

- Refer to the front of this manual for general test conditions, terminology, detailed descriptions of wiring faults and a general trouble shooter for electrical and mechanical faults.

### Accessing and erasing

- The immobilizer control module fault memory can only be accessed and erased using diagnostic equipment connected to the data link connector (DLC).

### Trouble code identification

Scanner type	Fault location	Probable cause
IMM-112	Immobilizer control module – internal fault	Trouble code IMM-121 stored, immobilizer control module
IMM-113	Immobilizer control module – EEPROM error	Immobilizer control module
IMM-121	Immobilizer control module – programming error	Incorrectly programmed, new immobilizer control module not programmed, immobilizer control module
IMM-122	Immobilizer control module – not programmed	New immobilizer control module not programmed, incorrectly programmed, immobilizer control module
IMM-132	Ignition key – none programmed	New immobilizer control module not programmed, incorrectly programmed
IMM-211	Engine control module (ECM)/fuel shut-off solenoid control module – communication error	Battery voltage low during engine start, electrical interference, wiring, ECM supply/earth wires, fuel shut-off solenoid control module supply/earth wires, immobilizer control module programming
IMM-212	Immobilizer read coil	Wiring, immobilizer read coil
IMM-213	Engine control module (ECM) – communication error	Electrical interference, ECM earth wiring, immobilizer control module earth wiring
IMM-214	Engine control module (ECM), communication – incorrect ECM model code	Incorrect ECM, immobilizer control module programmed for alternative ECM
IMM-221	Ignition key – no signal	Incorrect/damaged ignition key, wiring, immobilizer read coil, incorrectly programmed
IMM-222	Ignition key – incorrect signal	Incorrect ignition key, transponder defective
IMM-223	Ignition key – implausible signal	Ignition key damaged, wiring
IMM-224	Immobilizer control module – unable to program ignition key	Wiring, immobilizer read coil, incorrect/damaged ignition key
IMM-225	Ignition key – programming error	Incorrect/damaged ignition key, immobilizer read coil, wiring, electrical interference
IMM-232	Ignition key – not recognised	Incorrect key
IMM-233	Immobilizer read coil	Wiring, immobilizer read coil
IMM-234	Ignition key – no signal	Incorrect/damaged ignition key, immobilizer read coil wiring, electrical interference
IMM-235	Ignition key – incorrect signal	Incorrect ignition key, electrical interference
IMM-311	Engine control module (ECM), communication – short to positive	Wiring short to positive

**VOLVO**

Model: S/V40 • 850 • S/V/C70 • 940/960

**Immobilizer**

Scanner type	Fault location	Probable cause
IMM-312	Engine control module (ECM), communication – short to earth	Wiring short to earth
IMM-321	Engine control module (ECM), communication – no initialisation signal	Wiring, immobilizer control module/ECM supply/earth wires, ignition switched on with ECM disconnected, incorrect/faulty ECM, immobilizer control module, engine restarted within 4 minutes of cutting out (Fenix 5.2)
IMM-322	Engine control module (ECM)/fuel shut-off solenoid control module – communication error	Wiring, ECM supply/earth wires, fuel shut-off solenoid control module supply/earth wires, immobilizer control module
IMM-323	Fuel shut-off solenoid control module – communication error	Immobilizer control module programmed for alternative fuel shut-off solenoid control module, wiring, fuel shut-off solenoid control module supply/earth wires, fuel shut-off solenoid control module, immobilizer control module
IMM-324	Engine control module (ECM)/fuel shut-off solenoid control module – communication error	Wiring, ECM supply/earth wires, fuel shut-off solenoid control module supply/earth wires, immobilizer control module
IMM-325	Fuel shut-off solenoid control module – communication error	Immobilizer control module programmed for alternative fuel shut-off solenoid control module, wiring, fuel shut-off solenoid control module, immobilizer control module
IMM-331	Immobilizer warning lamp	Wiring short circuit
IMM-332	Starter motor relay	Wiring short to positive
IMM-333	Alarm system control module – communication error	Wiring
IMM-333	LED – control	Wiring
IMM-334	Immobilizer warning lamp	Wiring short circuit
IMM-335	Starter motor relay	Wiring short to positive
IMM-336	Alarm system control module, communication – signal too slow	Wiring short circuit

